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Environment and Economics Unit
EEU

Environmental Impact Assessment: Issues, Trends and Practice

Preliminary Version, June 1996

Prepared for

The United Nations Environment Programme
UNEP

by

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(Ron Bisset)

under the guidance and technical support of the

UNEP International Working Group on EIA

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FOREWORD

The main objective of *EIA: Issues, Trends and Practice* is to enhance the capacity of countries, particularly developing countries and countries in transition to market economies, to devise suitable country specific environmental impact assessment (EIA) guidelines and to address emerging issues facing the use of EIA to achieve sustainable development. The *EIA: Issues, Trends and Practice* document is intended to enhance coherence in the adoption of EIA practices, based on a review and comparative analysis of existing EIA practices. It identifies the underlying principles and the significant common features in the practice of EIA. Based on this comparative analysis, the document derives a set of key references for EIA practitioners to review, or develop, EIA guidelines appropriate to the specific needs, development priorities and socio-economic and cultural background of countries. EIA exhibits several of the key requirements for sustainable development. It is:

- a foundation tool – providing a sound basis of institutional development;
- well positioned for the next steps – providing a stepping stone to other integrative and strategic modes of analysis;
- recognisably successful – providing demonstrable benefits in the form of ecologically sound development, and fostering the inculcation of new policy values; and
- well suited to future capacity building – providing a 'hands on' means of professional and institutional strengthening.

The manual is one component of UNEP's integrated programme in Environment and Economics, which is directed to enhancing EIA capacity particularly in developing countries and countries in transition to market economies. This programme has been implemented by the UNEP Environment and Economics Unit in response to specific requests made at the United Nations Conference on Environment and Development (UNCED) and its Agenda 21, held in Rio de Janeiro in 1992, and UNEP Governing Council decisions.

To implement the recommendations of UNCED and the decisions of UNEP's Governing Council, UNEP convened an expert group meeting in October 1993 to assist in the development of a programme and a plan of action for EIA. In addition, the Environmental Assessment Summit, convened jointly by the International Association for Impact Assessment (IAIA) and the Federal Environmental Assessment Review Office (FEARO) [now the Canadian Environmental Assessment Agency (CEAA)] in Quebec, Canada in June 1994, emphasized capacity-building in EIA as an urgent priority. It specifically recommended 'clarifying the concept of EIA capacity-building and actively supporting and coordinating capacity-building initiatives'. UNEP was entrusted with the responsibility of establishing a working group to address this issue.

Immediately after the Summit, a series of working group meetings were held in Quebec to discuss and agree on the course of action to be adopted. The meetings, which were coordinated by UNEP, were attended by a core group of international experts attending the Summit and the IAIA Conference which was held after the Summit and at the same venue. The working group identified the need for the preparation of a Training Resource Manual (a generic set of basic training elements) that could be adapted to meet the specific needs of countries.

A UNEP sponsored workshop was help in Nairobi in September 1994. Participants of the workshop on Environmental Impact Assessment and International Cooperation, recommended the preparation of a 'good practices in EIA' document. The preparation of *EIA: Issues, Trends and Practice* implements this recommendation. This document will assist countries, particularly developing countries and countries in transition to market economies, to design EIA guidelines appropriate to their own circumstances.

In the recent past there has been a large number of guidelines generated for EIA, produced by bilateral, multilateral, UN organizations, development assistance organizations and consultants. The literature counts over 600 guidelines already in use. Inevitably this proliferation of documents has generated lack of coherence and consistency in the practices adopted, lack of focus on the needs and realities of developing countries and countries in transition, and confusion in the practical choice and use of the existing guidelines.

The heterogeneity of recipient countries, in terms of their level of economic development, their difference in growth paths, their institutional and legal structures, their ethnic, social and cultural background, the availability and accessibility of natural resources, requires more transparency about the fundamental principles underlying the adoption of EIA and a narrower focus on the needs and specific context of developing economies and transitional economies.

This document focuses on the needs of developing countries and countries in transition, at the same time attempting to enhance coherence in practices already in use.

The document therefore focuses on:

- the identification of the underlying principles of EIA;
- the comparative analysis of existing EIA guidelines;
- the identification of significant common features in the existing guidelines, and their absolute validity as key references for general EIA practices;
- the development of those features which apply to developing economies and economies in transition based on their specific socio-economic needs; and
- the identification of emerging issues, and their incorporation into EIA practices.

The document provides EIA practitioners with the basic principles to be adopted in the design of EIA or to be developed with reference to existing guidelines, particularly addressing emerging issues as they apply to developing and transitional economies.

It contains key references for the design of proper EIA guidelines, addressing, among others, the following issues:

- integration of EIA in the project life cycle;
- enhancement of EIA as a planning tool for promoting sustainable development, making explicit the linkage between micro (project-specific) EIA to EIA applied to programmes and policies, at the macro-economic level;
- integration of EIA with other existing tools for economic analysis, such as risk assessment, Cost Benefit Analysis, Natural Resource Accounting and other policy instruments;
- inclusion of monitoring as an integral part of EIAs;
- encompassing transboundary effects, assessing the impact of trade policies, budgets, structural adjustment programmes, national plans and projects of a regional nature; and
- developing methodologies to ensure transparency in the process and involve public participation.

This document is designed for use by EIA practitioners, particularly in developing countries and countries in transition to market economies. Practitioners will include private sector consultants, trainers and university faculty members, civil servants in local governments and funding agencies, and decision makers.

It is not easy to direct different categories of user to specific sections of the document. Given the nature of the subject, and the individual topics within it, specific issues are treated in more than one section (with perhaps, differing emphases). However, it is possible to give general orientation for different user categories as follows:

- *Government Departments/Agencies (wishing to introduce an EIA system or amend an existing set of procedures)* - Chapters 2-5, 7. If interested in introducing Strategic Environmental Assessment, see Chapters 6 and 8.
- *Private Sector Managers (introducing voluntary EIA procedures or managing EIAs)* - Chapters 2, 3, 4, 6 (section on privatization) and 8.
- *Non-governmental organizations* - Chapters 2, 3, 5, 6, 7 and 8 (especially 3 and 5 to assist them to be effectively involved in EIAs).
- *Consultants (preparing or reviewing EIAs)* - Chapters 3,4, 5, and 8.
- *Academics and students* - All chapters

For all these user categories the information and guidance is a 'synthesis' of a variety of concepts and practice. In EIA there are no 'correct solutions'. This document provides advice (especially chapters 2, 3, 5 and 7) which represents accepted international good practice on certain issues. Other Chapters – 4, 6 and 8 – provide pointers, suggestions and ideas for further consideration by the reader, prior to any attempt to apply the ideas or principles presented. EIA is at present in transition. Some of the 'directions' or recommendations may eventually be shown to have been 'misplaced' and others will, in the future, replace them. However, international capability will only improve through innovative 'trial and error'. It is hoped that readers will be encouraged to experiment, based on the contents of this document, and assist in the future advancement and improvement of EIA practice.

UNEP is actively engaged in building global EIA capacity. It is undertaking this task in a number of distinct but related ways. In addition to this document, it has supported the preparation of an *EIA Training Resource Manual* with training materials which will support practical, clear and coherent approaches to EIA. Both documents are preliminary versions, intended to be revised and updated through feedback received from tests and trial runs.

I am confident that the techniques and materials in the manual will be successful in encouraging a range of innovative approaches to the important task of establishing and supporting effective and relevant EIA processes at policy, programme and project levels.

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June 1996

ACKNOWLEDGMENTS

This document is the result of the cooperative efforts of a number of international experts committed to supporting environmental assessment as a major part of capacity building for sustainable development. The process of its preparation has been characterized as being transparent, participatory and open. It represents the views and concerns of a wide range of people with differing experiences and backgrounds. It has benefited extensively from the guidance and input of the UNEP established international working group of EIA experts, who have reviewed the document at three meetings sponsored by UNEP in Nairobi (January 1995), Durban (June 1995) and Geneva (January 1996).

UNEP acknowledges the many individuals and organizations who devoted their time and effort to the preparation of *EIA : Issues, Trends and Practice*. UNEP is especially grateful to Ron Bisset of Scott Wilson Resource Consultants for his input and effort in the preparation of this document. The advice and encouragement of the following group members was invaluable in determining the information to be included, and the form and content of this document: Hussein Abaza (UNEP, Head of Expert Group), Susan Becker (UNDP), Elizabeth do Nascimento Brito (PPA, Brazil), Shem Chaibva (International Council for Local Environmental Initiatives, Zimbabwe), Barry Dalal-Clayton (IIED), Peter Croal (CIDA), Robert Goodland (World Bank), Hans Gortworst (Geoplan, The Netherlands), Paddy Gresham (IUCN), Mohammed El Halwagi (Ministry of Scientific Research, Egypt), Ram Khadka (IUCN, Nepal), Patrice LeBlanc (Environmental Management Authority, Trinidad and Tobago), Mary McCabe (Environmental Protection Agency, Australia), Remi Paris (OECD), Maria do Rosário Partidário (New University of Lisbon), Renat Perelet (Institute for Systems Analysis Academy of Science, Russian Federation), John Raimondo (African Environmental Solution Pty Ltd, South Africa), Bronwyn Ridgway (EPA Fellow, Australia), Husain Sadar, (Carleton University, Canada), Barry Sadler (International Study of the Effectiveness of Environmental Assessment, Canada), Bob Weir (CIDA), Samson Werikhe (Uganda National Park Service). The contributions of other experts who attended some of the meetings are gratefully acknowledged: Fritz Balkau (UNEP-IE), John Boyle (Zimbabwe Natural Resources Management Programme), Horst Breier (OECD), Arne Dalfelt (World Bank), Abdoulaye Sene (Institut des Sciences de l'Environment, Senegal) and Anne Marie Skjold (IUCN, Kenya).

Much of the contents is based on the results of a number of national and international studies which have reviewed the effectiveness of EIA. Individuals and agencies have been generous in allowing UNEP access to their draft working papers and to the interim results of their research. In particular, a debt of gratitude is owed to the Canadian Environmental Assessment Agency (CEAA) and the International Association for Impact Assessment, (IAIA). The Director of the International Study of the Effectiveness of Environmental Assessment, Barry Sadler, provided initial drafts of the sections *Strategic EIA* and *Sustainable Development and EIA*. Considerable assistance was provided, also, by colleagues from the Environment Protection Agency, Australia, who prepared, under the guidance and technical support of the UNEP International Working Group on EIA, the companion document *Environmental Impact Assessment Training Resource Manual.*

Finally, the author would like to offer special thanks to Gail Welsh and Michelle Hunter for their hard work, over a long period, in the production of this document.

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1. INTRODUCTION AND OBJECTIVES

OVERVIEW OF CONTENTS

1.1 Currently, the need for an integrated, cross-sectoral and comprehensive approach to guiding the design and implementation of development has never been greater. The success and spread of the concept of sustainability is a symptom of this need. Practical application of sustainability criteria in development-related decision-making may still be rare, but its increasing use cannot be doubted. The traditional tools used to select, evaluate and manage developments are constantly subject to searching critiques and amendment in the light of sustainability principles. Great efforts are being expended by governments, international organizations and the private sector to devise and use improved techniques. Some international agencies have moved almost directly from tried and tested techniques such as cost-benefit analysis to experimental use of sustainability analyses and decision rules/criteria. There is a ferment of critical review, amendment and innovation which can be seen as characterizing a transition period whose final outcome is still unknown.

1.2 This document is a contribution to the current debate which characterizes this transition period and indicates some key issues which must be successfully managed if progress is to be made. Although a contribution to the debate, and in itself a symptom of the continuing discussion, this *Guide* is firmly based on the view that the current appraisal tool, termed environmental impact assessment (EIA) or environmental assessment, is a secure foundation upon which new approaches can be built. This 'article of faith' rests on the fact that, in global terms, EIA is the only tool whose use is required by law and whose results are publicly available. No other tool has this status, nor is any likely to achieve it in the near future. The national and international importance of EIA (in comparison to other tools) cannot be over-estimated and, thus, this document is based on the premise that permanent advances in the design and implementation of development will be based on EIA. Only the passage of time will show whether this view is correct.

1.3 EIA is a structured approach for obtaining and evaluating environmental information prior to its use in decision-making in the development process. This information consists, basically, of predictions of how the environment is expected to change if certain alternative actions are implemented and advice on how best to manage environmental changes if one alternative is selected and implemented. Until relatively recently, with a few notable exceptions, EIA focused on proposed physical developments such as highways, power stations, water resource projects and large-scale industrial facilities. Slowly, but increasingly, its scope of application is expanding to include policies, plans and other actions which also form part of the development process.

1.4 Decision-makers are provided, by EIA, with information (and often recommendations) on the anticipated consequences of their choices. EIA is, therefore, a management tool with technical input, not a technical aid with 'add on' management aspects. This distinction is crucial to an understanding of the objectives of EIA and how it can best be implemented.

1.5 EIA has been in existence since 1970 (when it was introduced into the United States of America following the National Environmental Policy Act coming into effect) and has spread rapidly since then to all parts of the world. EIA is still relatively 'young' and the number of countries which use it, as a legal/administrative requirement, is still increasing. At the same time, EIA practice (and the techniques used) is evolving as experience has been gained on its utility in a wide range of development and geographic contexts.

1.6 The use of EIA has been formalized by the introduction of national laws and regulations and, in some cases, policies which establish systems of institutionalised procedures to ensure that all proposed physical development, expected to be environmentally damaging, is assessed prior to authorization and possible implementation. These systems of linked and integrated procedures set out the 'rules' by which:

- individual proposed actions are subject to an EIA study;
- such EIAs are conducted;
- EIA results and recommendations are used in decision-making; and
- if an authorization is obtained, how the results are used to guide and assist the implementation and operation of the proposal.

1.7 Thus, there are two distinct, but related, aspects which characterise EIA and which must be considered by any government, agency or private sector entity wishing to introduce EIA into development decision-making. First, there is the type, nature and scope of the EIA system (set of procedures) to be introduced. Secondly, there are issues relating to the conduct of the individual studies needed for specific proposals. This document focuses on both these aspects of EIA.

OBJECTIVES OF THIS DOCUMENT

1.8 Although covering a wide range of topics in EIA, this document is aimed, primarily, at two main categories of reader. They are:

- central/local government staff with responsibilities for ensuring effective implementation of EIA procedures and playing a significant role in appraising, approving or managing developing projects; and
- managers with environmental responsibilities in the private sector.

It may be useful also to staff of non-governmental organizations, those working in higher education centres and research institutes, and students following a range of courses focusing on aspects of planning, engineering and business management.

Government Staff

1.9 Currently, there are a significant number of countries which are in the process of introducing new or amended laws, regulations and/or guidelines for EIA or are likely to do so in the near future. Many of these countries do not possess a group of EIA 'experts' with easy access to international thinking/writings on EIA. Often, there are individuals who have a reasonable knowledge of EIA basics, but who feel a certain sense of isolation in terms of their familiarity with, and access to, mainstream EIA concepts and practice. In most cases they possess copies of guidelines and similar documents, but are not certain if these form a representative sample of current 'good EIA practice'. It is, often, to these individuals that governments turn when they wish to draft a law, regulation or guidelines. It would be of great benefit to these people and their governments if they could obtain and use 'model' or 'reference' EIA advice or guidance which summarizes the important common features of good EIA practice at the project level. This information needs to be combined with emerging thinking, and practice, in the application of EIA and EIA-like approaches to a variety of development-related actions such as structural adjustment programs, transport plans, trade agreements and national policies. Such guidance needs to focus on issues, concepts and approaches in a non-country specific and neutral manner. It is the objective of this document to provide this guidance.

Private Sector Personnel

1.10 The information and advice presented on these emerging themes and practices will be of use to managers, particularly those with environmental responsibilities, in parastatals and in the private sector. Currently, many state-owned enterprises and parastatals are being privatised and decision-making is devolved to the 'new' managers. Individual managers may find specific issues, such as the guidance on EIA and environmental management systems, of particular interest as they improve environmental performance within their companies or installations. Such action is needed to attract investment and improve market share by demonstrating concern, backed up by specific initiatives, for the environmental implications of commercial and related activities.

EFFECTIVENESS OF EIA

1.11 After twenty-five years of EIA implementation it is appropriate to review, on an international basis, the effectiveness of EIA. Numerous national reviews have occurred, but these have focused on differing issues and aspects and have not been co-ordinated to provide a coherent global overview. However, over the past two years there has been a major international review, the International Study of the Effectiveness of Environmental Assessment, sponsored by the International Association of Impact Assessment and the Canadian Environmental Assessment Agency (Sadler, 1995). This study has been wide-ranging in its scope and comprehensively thorough in the depth of its analysis and, therefore, provides an excellent international perspective to add to the range of national reviews.

1.12 An analysis of these reviews shows that there are many common objectives and activities in EIA systems and practice. It shows, also, the strengths and weaknesses of EIA. During the previous twenty-five years many countries have reviewed the performance of their EIA systems and have introduced amendments to improve effectiveness. These reviews have included careful consideration of critical comments focusing on perceived disadvantages, but to date no country has abandoned EIA, or weakened its EIA procedures. Indeed, the amendments made have tended to act to strengthen these procedures and increase their scope and effectiveness. Also, international agencies and conferences, such as the 1992 United Nations Conference on Environment and Development, have requested governments to either strengthen their EIA procedures or, if they do not have such procedures, to introduce EIA as soon as practicable. Thus, EIA has been 'tried and tested' although predominantly at the project level.

1.13 The main advantages and benefits of EIA are:

- improved project design/siting;
- more informed decision-making;
- more environmentally sensitive decisions;
- increased accountability and transparency during the development process;
- improved integration of projects into their environmental and social setting;
- reduced environmental damage;
- more effective projects in terms of meeting their financial and/or socio-economic objectives; and

- a positive contribution toward achieving sustainability.

Despite widespread agreement on these achievements, it is recognized that they do not occur uniformly or consistently in all countries or organizations.

1.14 The studies of EIA effectiveness show a number of difficulties and constraints which prevent and hinder EIA from consistently delivering these advantages and benefits. These difficulties and constraints relate both to EIA systems and to the conduct of individual EIA studies. In addition to weaknesses in application, it is now widely perceived that there are entire areas of the development process to which EIA is not applied consistently or effectively. These constraints in the current application of EIA are identified below and emerging mechanisms or approaches for dealing with them are presented in subsequent chapters. In this way, it is hoped that this document will assist more efficient and cost-effective use of EIA throughout the world.

1.15 Analyses of the effectiveness of EIA have identified a variety of important constraints, generally, although not universally, applicable. These can be summarized as follows:

EIA Scope

- main focus limited to major physical development projects and little application to national, sectoral and regional development plans;
- small-scale projects not included in most EIA systems although their cumulative impacts may be significant over time;
- no application to macro-economic initiatives such as structural adjustment programs or budgetary/taxation initiatives; and
- no application to trade arrangements and agreements.

EIA Application

- difficulties in ensuring adequate and useful public involvement and, therefore, participation;
- insufficient integration of EIA work with feasibility and similar studies in the project life-cycle and major decisions being made before EIAs are completed;
- lack of consistency in selection of developments requiring specific EIA studies;
- weak procedures for obtaining early agreement on the scope of EIA studies;
- inadequate understanding of the relative roles of baseline description and impact prediction;
- poor integration of biophysical environmental impacts with social, economic and health effects;
- production of EIA reports which are not easily understood by decision-makers and the public because of their length and technical complexity;
- lack of mechanisms to ensure that EIA reports are considered in authorization decisions;
- weak linkages between EIA report recommendations on mitigation and monitoring and project implementation and operation; and
- limited technical and managerial capacities in many countries to implement EIAs.

1.16 Basically, EIA application to physical development projects requires general improvement, and key types of other development-oriented initiatives, which are known to be environmentally damaging, need to be subject to EIA scrutiny. It is the intention of this document to suggest ways to remedy these weaknesses and overcome these constraints.

EIA : A TOOL FOR SUSTAINABLE DEVELOPMENT

1.17 Since the publication of the Report of the World Commission on Environment and Development (1987), commonly known as the Brundtland Report, the concept of sustainable development has exerted enormous influence on thinking and, to a much lesser extent, practice in relation to the type of development best suited to the needs of current and future generations in a particular locality. The problem has been to find mechanisms, tools and approaches which could be used, in all socio-economic conditions, to assist countries move toward achieving their sustainability objectives. Basically, how does a government know whether a particular development initiative moves it toward or away from sustainability (it may, of course, be neutral!)? It is clear that there is no single 'magic bullet' which can be used, but it is becoming obvious that a suite of tools or approaches, in varying combinations, can be applied. One of these tools is EIA. In the future, attention will focus, increasingly, on adapting and using EIA, in conjunction with other tools, as a means of testing development proposals against pre-determined sustainability criteria. Examples of such tools or techniques are:

- environmental auditing (as a component of facility environmental management systems);
- technology assessment; and
- life-cycle assessment.

The linkage between EIA and sustainability is discussed in Chapter 8.

LINKAGES WITH OTHER INITIATIVES

1.18 Preparing this document is one component of an integrated programme of EIA activities being undertaken by the United Nations Environment Programme (UNEP). This programme is implemented by the UNEP Environment and Economics Unit in response to specific requests made at the UN Conference on Environment and Development (in particular Agenda 21), held in Rio de Janeiro in 1992, and at the 17th Session of the UNEP Governing Council. These requests, respectively, ask UNEP to,

> *'.... (undertake) further development and promotion of the widest possible use of environmental impact assessment, including activities carried out under the auspices of United Nations specialised agencies'*, and
> *'.... promote widespread use of environmental impact assessment (EIA) procedures by Governments and, where appropriate, international organizations as an essential element in development planning and for assessing the effects of potentially harmful activities on the environment.'*

1.19 Basically, UNEP is actively engaged in building global EIA capacity. It is undertaking this task in a number of distinct, but related ways. In addition to the preparation of this document, it is preparing an *EIA Training Resource Manual* (with the assistance of the Environmental Protection Agency, Australia). The Manual will complement this document and EIA trainers using the Manual can obtain useful examples, suggestions, advice and recommendations in this document for incorporation in their training modules. In essence this document will act as a supporting document to the *Training Resource Manual.*

1.20 UNEP has issued generic EIA guidance previously. The most recent example is the document *Environmental Impact Assessment : Basic Procedures for Developing Countries* (1988) prepared by the UNEP Regional Office for Asia and the Pacific. Another important generic source of advice was issued by OECD in 1992 entitled *Good*

Practices for Environmental Impact Assessment of Development Projects. This current Guide builds on this previous excellent work and provides some additional advice and directions based on more recent thinking and good practice.

1.21 The UNEP work, fortunately, has coincided with recent national and international reviews of EIA effectiveness (Box 1). The preparation of this document has benefited greatly from the work done in these other important initiatives.

Box 1 : Recent Reviews of EIA Effectiveness

Sadler, B (1995) *Environmental Assessment: Toward Improved Effectiveness* Interim Report and Discussion Paper. Hull, Québec : Canadian Environmental Assessment Agency on behalf of the International Study of the Effectiveness of Environmental Assessment.

Commission of the European Communities (1993) *Report from the Commission on the Implementation of Directive 85/337/EEC.* COM (93) LP final. Brussels : Commission of the European Communities.

Wood, C (1995) *Environmental Impact Assessment : A Comparative Review.* London : Longman Higher Education.

NATO Committee on the Challenges of Modern Society (1994 et seq) Various Reports. Brussels: NATO.

van der Wansem, M. and D. Smith (1995) *A Comparison of Environmental Impact Assessment in Three Asian Countries.* Washington, D.C. : World Resources Institute.

The World Bank (1995) *Environmental Assessment : Challenges and Good Practice* Environment Department Paper No. 018. Washington, DC : The World Bank

An important recent compendium and source of information on EIA guidelines, handbooks etc is IIED, WRI and IUCN (1995) *A Directory of Impact Assessment Guidelines.* London : IIED.

USING THIS DOCUMENT

1.22 There are still a number of countries which need to formalize voluntary or donor-driven EIA practice into a formal system by drafting and, subsequently, promulgating:

- an EIA law;
- an EIA regulation under a generic environmental law (which may already contain an EIA provision); and
- accompanying EIA guidelines .

1.23 Countries which possess, already, the necessary laws/regulations for project-level EIA may wish to extend their scope to include:

- Strategic Environmental Assessment (SEA);
- procedures for dealing with transboundary issues;
- improved public and formal consultations; and
- linkages between EIA and achieving sustainable development.

1.24 At present, those charged with the task of devising laws/regulations/guidelines have access to certain, but by no means all, existing guidelines and similar documents produced by governments and agencies. All of these have been produced within, and are a product of, a particular socio-political institutional history and context. They reflect the interests, concerns and aspirations of the initiating country or agency. This 'factor' can influence any in-country production of EIA laws/regulations/guidelines which are derived from similar documents previously produced elsewhere, and for use in other national and agency contexts. The result of such 'transfer' has been the implementation of new EIA systems which are not wholly consistent with the socio-political realities of the country to which they are applied. The consequences of this situation can be relatively serious:

- misunderstandings of the EIA system;
- slower project authorization processes;
- dissatisfied non-government organizations (NGOs)/public interest groups and members of the public; and
- poor decisions.

Overall, the EIA system comes to be seen as ineffective, and commitment and support for EIA as a decision-taking aid weakens. At worst, the system ceases to operate and, at best, costly revisions and amendments have to be made and the revised system 'sold' to a sceptical public.

1.25 Provision of a guide to good EIA practice, which is not tied to a particular country or agency, would help avoid some, if not all, of these potential problems. In essence, a 'neutral' set of guidelines would contribute to the following benefits:

- country-specific EIA systems tailored to the realities of the country;
- saving of time and money in preparation of the laws, regulations and guidelines; and
- creation of EIA systems which should be cost-effective and need little, if any, revision in the short to medium term.

The end result will be better and speedier development decisions which reduce significantly environmental damage from the development process.

1.26 Although the main audience for this document will be governments, and their staff, much of the contents will be of use to managers with environmental responsibilities in the private sector and in parastatals. In some cases, such individuals prepare EIA reports voluntarily or introduce informal EIA procedures for new proposals which apply in specially designated areas, for example export processing zones or industrial estates. Such individuals will find useful advice and information in selected sections of this Guide.

SELECTION FOR END USE

1.27 This document is a resource. It attempts to summarize the main elements of good practice (where these can be identified) and current concepts/ideas on EIA practice which appear to be those most likely to become good practice in the near future. It is comprehensive in its coverage.

1.28 It is not easy to direct different categories of user to specific sections. Given the nature of the subject, and the individual topics within it, specific issues are treated in a number of sections (with, perhaps, differing emphases). However, it is possible to give general orientation for different user categories to those chapters which cover, broadly, specific issues:

- ***Government Departments/Agencies (wishing to introduce an EIA system or amend an existing set of procedures).***
  Chapters 2-5, 7. If interested in introducing Strategic Environmental Assessment Chapters 6 and 8.
- ***Private Sector Managers (introducing voluntary EIA procedures or managing EIAs).***
  Chapters 2, 3, 4, 6 (section on privatization) and 8.

- ***Non-governmental Organizations***
  Chapters 2, 3, 5, 6, 7 and 8 (especially 3 and 5 to assist them to be involved, effectively, in EIAs)
- ***Consultants (preparing or reviewing EIAs)***
  Chapters 3, 4, 5 and 8
- ***Academics and students***
  All chapters

1.29 For all these user categories the information and guidance is a 'synthesis' of a great variety of concepts and practice. In EIA there are no 'correct solutions'. This document provides advice on certain issues (especially Chapters 2, 3, 5 and 7) which represent accepted international good practice. Other issues (Chapters 4, 6 and 8) provide pointers, suggestions and ideas for further consideration by the reader, prior to any attempt to apply the ideas or principles presented. The content of this document reflects, as it must, the current transition phase which categorises EIA at present. Some of the directions or recommendations may be shown to be misplaced and others will, in the future, replace them. However, international capability will only improve through innovative trial and error It is hoped that readers will be encouraged to experiment, based on the contents of this document, and assist the future advance and improvement of EIA practice.

2. APPROACHES TO DEVELOPING AND IMPLEMENTING EFFECTIVE EIA PROCEDURES

THE CONTEXT AND CHALLENGES

2.1 Many developing countries and countries with economies in transition are attempting to consolidate recent fundamental political and economic changes. These changes have basically involved a movement from centralized economic planning toward a reduction in government intervention and control of the economy accompanied by increased democratization. In many countries this process involves privatization, decentralization of power and authority and enhanced public and other stakeholder involvement in the political process.

2.2 Throughout these changes EIA has continued to be used effectively and, indeed, some of these changes have encouraged governments to introduce EIA systems or amend them to become more effective. The process of preparing National Environmental Action Plans has been especially influential, particularly in Africa, in showing the need for EIA systems. The positive contribution that EIA has made, and will continue to make, is well recognized. The challenge is to design new or revised EIA systems which can build on past success and take advantage of current problems and constraints.

2.3 Many countries share common challenges such as:

- limited public involvement in political decision-making;
- low levels of social organisation and mobilization of communities at the local level;
- low levels of awareness of the importance of environmental management and sustainable development amongst government sectors and the public;
- weak judicial processes;
- weak enforcement of laws and regulations;
- relatively low status of environmental agencies in governmental hierarchies; and
- poor co-ordination between agencies at the national level and between national and local levels.

2.4 To be effective, EIA procedures must take account of these realities. However, they should not be constrained by them. In fact, EIA procedures can have important effects in reducing and even removing some of these weaknesses. In this chapter, guidance is provided on mechanisms to help ensure effective introduction and subsequent implementation of EIA systems in countries which share these characteristics. Box 2 summarizes important factors to be considered when introducing or amending EIA systems.

Box 2 : Summary of Key Elements in Design of EIA Systems

Below is a summary of the main factors to be considered when introducing or amending an EIA System:

- a legal base with accompanying regulations and guidelines;
- stakeholder involvement (including the public);
- creation of high-level political commitment;
- technical capacity;
- formal review of EIA reports by a designated government agency(ies);
- mechanisms to encourage accountability of decision-makers for their decisions on proposed development action; and an
- appropriate role for an environmental agency in the procedures and decision-making.

These are discussed in detail in this chapter.

APPROACHES TO INTRODUCTION OF EIA PROCEDURES

2.5 Internationally, there is a trend towards introducing national EIA systems through legal instruments such as specific laws or regulations under existing composite or framework environmental laws. A number of countries initially introduced EIA systems via administrative and policy decisions. Often, later, these countries formalized the EIA systems by introducing a law/regulations. Having a law/regulations is a necessary foundation for EIA systems, but it does not ensure effective implementation. Implementation depends on many factors including these components of an overall EIA capacity:

- high-level political commitment/financial support;
- effective environmental policy;
- administrative arrangements and cross-sectoral awareness;
- implementing guidelines;
- personnel resources
  -managers of EIA systems
  -reviewers of EIA reports
  -staff to prepare EIA reports;
- operational centre of EIA expertise
  -training
  -research
  -consultancy
  -databases;
- media awareness and interest; and
- EIA modules in relevant courses in institutes of higher education.

2.6 Building an EIA capacity with these components may take two to three years to complete. Ideally, it is preferable if laws or regulations are the 'organic' result of an informal process which is based on a period of experimentation and cross-sectoral familiarization with non-statutory procedures. Through such a mechanism a locally adapted system may be produced which is workable and has a widespread basis of commitment and support amongst those who will play an important role in implementing the EIA procedures. Such a system is not, therefore, an imposition from the 'top towards the bottom'; instead it is a system which has emerged from the 'bottom towards the top'. Box 3 describes the process followed in Nepal to create both an EIA system and EIA capacity.

Box 3 : EIA Capacity Building in Nepal

Between 1985 and 1988, Nepal undertook the preparation of a National Conservation Strategy (NCS). The Strategy and the Eighth Five Year Plan both stressed the need for establishing an EIA system which was designed to meet Nepali needs.

In this context, the National Planning Commission (NPC), in collaboration with IUCN - The World Conservation Union, implemented a programme to prepare comprehensive national and sectoral guidelines to help in establishing a national system for EIA, with the appropriate legal framework to facilitate implementation. Since the EIA process is multidisciplinary, this programme emphasised the need for intersectoral co-operation and co-ordination.

The initiatives for developing an EIA system in Nepal began in 1990. The process of developing EIA guidelines and their implementation required a participatory approach with the formation of an intersectoral and multidisciplinary network involving people from various government sectors, NGOs and the private sector. This network was recognized as the Environmental Core Group (ECG) consisting of 110 members representing 17 ministries and departments of government, 10 NGOs, and 7 private sector organizations. Over a period of four years, ECG members were involved in a series of field-oriented professional interactions

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and participated in intensive 'EIA guideline' development workshops, initially for developing national EIA guidelines, and subsequently for developing sectoral guidelines. ECG members worked on short-term assignments with NPC/IUCN and relevant ministries to test the draft national and sectoral EIA guidelines.

While drafting EIA guidelines, ECG members adopted a learning-by-doing approach in a participatory manner. The process of drafting was also effective in raising awareness among the ECG members. Most of the members involved in the process have become environmental motivators, advocates, and environmental administrators in their respective sectors. The development of the EIA guidelines has promoted a sense of ownership while developing the necessary manpower to implement them.

The ECG approach emphasises minimal dependency on outside experts, ensures that EIA guidelines are tailored to local conditions, and aims to develop a resilient and self-reinforcing network of environmental expertise within the existing government, NGO and private sectors. Nepal now has an indigenous technical capacity, and the local commitment to make it effective, operating within EIA legislation adopted as one of the end products of the ECG process.

2.7 If no time or resources for a capacity-building programme are available then it is possible to devise an intermediate strategy. If a government wishes to introduce a law or regulations in a short time period then it should involve the key stakeholders in the drafting process. Box 4 shows how EIA Regulations were prepared in Swaziland and Zambia. The approach followed in these countries has a number of advantages. It can result in a technical and institutional strengthening of the proposed EIA procedure through the cross-sectoral nature of the commenting and review process. Also, through involvement in a participatory process, a step is taken to create a constituency of support and commitment. These advantages are unlikely to occur if laws or regulations are developed internally, without consultation, and then imposed.

Box 4 : Preparation of EIA Regulations in Swaziland and Zambia

Both countries have framework or umbrella environmental laws which require EIAs, but did not establish an EIA system. Consequently, individual EIAs were not implemented systematically or consistently. The relevant environmental agencies (Swaziland Environment Authority and the Environmental Council of Zambia) decided to prepare EIA Regulations and accompanying Guidelines to establish administrative systems which would ensure that EIAs were undertaken on a consistent basis. The basic approach followed was very similar. An initial draft was prepared internally. This draft was circulated to the important stakeholder organizations which would be involved in implementing the EIA system. Representatives of these stakeholders were invited to attend a workshop to provide their comments on the draft and to discuss and agree suggested amendments. In both countries the stakeholders included representatives of:

- central government ministries and departments;
- NGOs;
- parastatals; and
- the private sector.

Following the initial workshop a revised draft was prepared which went through the same process resulting in an agreed draft which could proceed to the appropriate 'legal affairs' department for drafting and presentation to the Cabinet or appropriate authorising body. Both countries used external consultants at key stages to assist in the drafting work.

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APPROACHES TO MAKE EIA PROCEDURES EFFECTIVE

2.8 What is meant by effective? One important aspect is cost-effectiveness. What are the costs and benefits and how may they be distributed within a country which introduces EIA? There is no doubt that preparation of EIA reports costs money. This cost is borne by the proponent under the self-assessment process in which the proponent is considered responsible for the EIA and the subsequent EIA report. The self-assessment process is considered appropriate because it is the proponent who will benefit from a proposed development action and, therefore, in accordance with the 'polluter-pays' principle should accept the cost. Experience has shown that the cost of preparing EIA reports falls within the range of 0.01 per cent to 1 per cent of capital cost (depending on the type of project and its location). Should a development action be authorised then the cost of implementing an impact management plan may add further to the environmental cost to a proponent, perhaps as much as an additional 1-15 per cent to the capital cost. On the other hand EIAs have resulted in design and site changes which have reduced costs, thus saving proponents' money. There is little evidence that EIA-related costs have 'stopped' projects. There is a cost, also, to government in administering an EIA system, particularly in relation to involvement in consultations, review and follow-up and enforcement. Governments may recover some of the costs by charging fees, for example, when an EIA report is submitted for review and when issuing an approval document. The aim is to recover administrative costs (at least partly); this is generally done through a standard charge.

2.9 While it is essential to be realistic regarding EIA costs, it should be recognized that EIAs can result in savings at the national level and enhance economic performance. The benefits from EIA tend to be long-term, diffuse and widespread whereas the costs tend to be immediate or short-term and are seen to be borne by specific proponents and organizations. The benefits to a country are based on the prevention of environmental damage (which might need to be repaired by the public sector at a later date) and the move toward sustainability created by effective EIA implementation. Economic performance can be enhanced (benefiting both proponents and the country) by:

- reduced delays in approval procedures; and
- better designed projects which are made more economically efficient by
  - provision of cleaner working environments leading to enhanced worker productivity
  - use of recovery and recycling in managing wastes, and
  - 'built-in' resistance to possible environmental changes affecting project performance.

2.10 It is critical that governments introducing EIA take measures to ensure that the institutional and administrative frameworks are clear and well-understood, thus reducing the costs of possible administrative confusion and inefficiencies. Any law needs to be accompanied by a set of Regulations or Guidelines which clarify the roles of the different parties and establish their interactions. It is preferable if there has been, at most, a programme of capacity-building leading to preparation of a law or regulations or, at least, widespread consultations on drafts of laws or regulations. Experience has shown that there will be a period of adjustment, probably at least five years, in which all parties to the EIA system slowly become accustomed to the procedures and their roles. This is a period of trial and error, experimentation, mistakes and precedent-setting in which, generally, an administrative *modus operandi* emerges. It is essential to have an operational review of EIA procedures at a specified date (for example, in the European Union it was 5 years after the implementation date of the EIA Directive). Such a review can identify problem areas and suggest remedies in terms of administrative practice or, if necessary, amendments to laws and regulations.

2.11 The International Study of the Effectiveness of Environmental Assessment has identified a number of activities which are often weak in national EIA systems. These will form the basis for the recommendations which follow in terms of improving institutional aspects of EIA. The weaknesses are:

- scoping;
- stakeholder involvement;
- relationship to decision-making;
- quality control; and
- post-approval follow-up and review.

2.12 These are not independent activities operating in isolation from each other, although the number and strengths of the linkages between the various activities vary. One of them, 'stakeholder involvement', has a direct bearing on all the others. There is a strong global trend toward making EIA open, transparent and democratic and hence making all parties more accountable for their actions.

2.13 The timing and nature of public involvement activities plays a crucial role in EIA effectiveness. In scoping, it helps ensure that likely significant issues/impacts are identified and investigated. It also provides a context by which indigenous local knowledge can be identified and used effectively in EIA work. Scoping can, also, establish a framework and programme for continuing involvement during preparation of EIA reports. This will help ensure that the EIA is kept 'on track' in terms of the scoping results and that the EIA is responsive to any new issues. Perhaps, more importantly, stakeholder involvement will help ensure that the quality of the EIA work is maintained at an acceptably high level. Such involvement should always involve the proponent and one or more representatives from the design team. In this way a continuing dialogue can occur between the proponent and the stakeholders which can focus on the interaction between the EIA and the form/location of the proposed development action. Basically, via involvement there is an 'open' mechanism by which preliminary and draft EIA results can be used to alter and improve the project.

2.14 It is a common failing to focus all attention on any 'final' approval decision as the main or only way of ensuring an environmentally sensitive project. A final approval is important, but if EIAs are undertaken throughout project life-cycles then the importance of this decision may, in some cases, decline. However, it remains true that, at a 'final' approval stage, all aspects including the environment are considered and trade-offs made. Often, a 'final' approval decision is crucial and a special mechanism may be needed to encourage decision-makers to include EIA results in their deliberations and decisions.

2.15 Such a mechanism may be a requirement that the decision-making body (probably an authorising agency) issues, publicly, an account of the decision-making process and how the EIA results were used. Also, if a decision were made to select an alternative which is likely to cause more environmental damage than the other options, then the reasons justifying this choice must be given. Additionally, the 'record of decision' may include a requirement that any impact management plan (or amended version) be formally adopted as part of an approval document. This 'record of decision'

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mechanism is not widely used, but does operate in the USA and the Netherlands - two countries with extensive EIA experience. Such a system does not 'force' decision-makers to act on the EIA results, but does encourage them to be more sensitive to them. Given extensive stakeholder involvement in EIA up to, and including, the approval decision it is more likely that proponents, whose developments are authorised, will implement the impact management plan. There will be attentive, knowledgeable and watchful publics which will have a strong interest in post-approval environmental management, particularly if a community liaison committee is established (see Chapter 3). Of course, an informed public is not enough; formal technical systems and institutional structures will be required to regulate project-environment interactions. A useful way of assisting in the process is to incorporate use of environment management systems (incorporating auditing) into EIA procedures. In this document this tool will be referred to as environmental management audits.

2.16 Providing a framework for continuing and extensive stakeholder involvement will give considerable assistance to effective EIA implementation. Further support for this objective may be obtained from the role of the agency or body which is responsible for the EIA system. There are a number of 'models' for this role ranging from a 'hands off' approach to one which emphasises an active participatory and regulatory role. In many countries with well-established planning systems procedures for control of developments and consultative frameworks the 'hands off' model may be appropriate. In the opposite situation, which characterizes many developing countries and some economies in transition, a proactive, interventionist and regulatory role may be more appropriate.

2.17 For example, the environmental agency may have one or more of the following roles in an EIA system:

- approval of Terms of Reference (ToRs) for EIAs;
- implementation of stakeholder involvement, including a formal public hearing on draft/final EIA reports;
- issuing an environmental approval (or similar decision document) without which a project cannot proceed; and
- control over environmental management audit procedures.

2.18 Approval of a ToR gives an agency considerable powers to ensure that an EIA report is relevant, acceptable and useful. Power to issue an environmental approval (in essence making the authorization decision) is more controversial and occurs rarely. However, an intermediate role may be appropriate. Environmental agencies may be allocated the power to make a recommendation as to whether an approval should be issued. If the recommendation is against approval, and the authorising agency wishes to approve, then the decision may be deferred 'upwards' to the appropriate line Ministers (for example, in the case of a power station the Minister for Environment and the Minister for Energy). If no agreement is reached then the decision could be referred to the full Cabinet or to a specially constituted Administrative Tribunal.

2.19 Meaningful stakeholder involvement and an active oversight role for an environmental agency can assist in ensuring EIA procedures respect fairness, equity and quality criteria. These may be supplemented by additional safeguards such as:

- introducing a register of approved consultants (eg Poland, China);
- applying strict legal limits to the relationships between proponents and consultants (eg Brazil);

- requiring that one member of any EIA team is based or lives in the area likely to be affected (under consideration for the proposed Zambian EIA system); and
- including penalties in EIA laws/regulations which will deter non-compliance with requirements.

2.20 Of course, the possible 'models' outlined above are options available to governments and EIA system designers. Their appropriateness can only be determined by considering carefully the local context.

RELATIONS BETWEEN NATIONAL EIA PROCEDURES AND EIA REQUIREMENTS OF MULTI- AND BI-LATERAL AGENCIES

2.21 Many governments face a potential problem in implementing EIAs when development projects may be financed or co-financed by such organizations. Most of these organizations have their own internal EIA procedures which are applied in their decision-making. Although all these organizations respect national EIA procedures, there is a potential for duplication, wasted effort and confusion. It is not cost-effective to have more than one EIA for a development action.

2.22 There are two basic strategies which can be adopted to deal with this situation. First, if a government is considering the introduction of EIA, or a review of existing procedures, then if it follows the EIA principles recommended in this document (especially in Chapter 3) the resulting system will incorporate virtually all the requirements of these organizations. Of course, their procedures are reviewed and change, periodically, and complete coherence and synchronisation is impossible. However, potential for overlap and ambiguity can be reduced, significantly, if this approach is taken. Essentially, in practice, if the principles of a national EIA system are compatible with those of a multi- or bi-lateral agency then no problems should occur in terms of 'EIA approval'.

2.23 Secondly, for individual EIAs, a government should consult with a financing agency to identify, explicitly, any specific additional requirements to ensure 'immediate' compliance, thus avoiding the need to change or add items once the EIA is completed or nearly complete. This should be done before EIA work begins and agreement should be recorded. When there is co-financing then the government should request that there is agreement, amongst the financing agencies, on the EIA requirements to be followed. This should not be too difficult to achieve as the OECD has produced guidance to its members (the major bi-laterals) on achieving coherence in EIA requirements. Unfortunately, a similar initiative for the multi-laterals is not so far advanced.

LINKING EIA AND ENVIRONMENTAL MANAGEMENT AUDIT SYSTEMS

2.24 Many developing countries and countries in transition face environmental problems which result from existing operating installations such as steel-making or fertiliser-producing factories. Often, in such countries, concern is expressed that such facilities need to be managed in a more environmentally sensitive manner. Traditionally, EIA was linked to proposed development actions whereas existing projects were considered as the focus of a separate environmental management audit system. The 'barriers' are beginning to weaken and closer links are being developed between EIA and environmental management audits. Countries which are introducing or amending:

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- an EIA system; or
- an environmental management audit system

have an opportunity to link them together in an integrated environmental management system focusing on physical developments.

2.25 Environmental management audit systems have been in operation in a number of countries for varying time periods, on both voluntary and statutory bases. The use of this tool is spreading; for example, the European Union issued its Regulation on eco-management and audits (the same as environmental management audits) in 1993 and thereby established a voluntary scheme applying to all Member States. The influence of the environmental management system standard (which includes audits) established by the International Standards Organisation (ISO 14000 series) will be effective in encouraging use of this technique.

2.26 At present, there is little experience of merging EIA and environmental management audits, except for the BAPEDAL system implemented by the Ministry of Environment in Indonesia and the recent EIA procedures in Poland (now altered to resemble the EIA procedure common to all Member states of the European Union). Box 5 shows the basic features of a proposed system, linking EIA and environmental management audits, from Swaziland.

2.27 The use of EIA in privatization strategies has confirmed the increasingly close links between different kinds of audits and EIA. In EIAs for sectoral or project-level privatization initiatives, liability audits are undertaken, often in conjunction with EIAs. Even when implemented separately they are structured in a way similar to EIAs with stakeholder involvement and a similar role for their results in decision-making. The relationships between EIA and the variety of audits is an emerging and complex issue which cannot be considered, fully, in a document whose main focus is on improving EIA practice.

Box 5: Regulations for EIA and Environmental Management Audits : Swaziland

The Swaziland Environmental Authority (SEA) has prepared a draft Regulation which integrates EIA and environmental management audits. It is based on the fundamental premise that both existing and proposed projects require environmental consideration to be integrated into design, approval and operational decisions relating to these projects. The key activity is seen to be impact management on the basis of agreed mitigating or corrective measures backed by monitoring procedures to determine the success of these measures.

Given the focus on impact management it is relatively easy to link EIA and environmental management audit systems. Following an EIA (and assuming approval), it is recommended that the proponent prepare and implement a Comprehensive Mitigation Plan. This Plan might, if considered relevant by the SEA, contain a requirement that an environmental management audit system be established and implemented. The Comprehensive Mitigation Plan would be reviewed regularly through Project Compliance Reports prepared by the proponent and checked by the SEA. SEA retains the right to enter premises, inspect equipment and records, and interview staff, and to do so randomly.

The Swazi draft Regulation requires, also, proponents of existing facilities to initiate a system to improve their environmental performance. The first stage is an assessment of the major environmental effects of the existing facility and preparation of a Comprehensive Mitigation Plan which will establish objectives and mechanisms to achieve them. Performance will be evaluated via periodic audits which will result in Project Compliance Reports. The Comprehensive Mitigation Plan will be evaluated and updated via Project Compliance Reports as per the EIA requirements.

3. BASIC PRINCIPLES OF EIA PRACTICE

3.1 A review of selected key recent existing EIA guidelines, handbooks, and sourcebooks and recent 'reviews of EIA practice' has allowed common EIA principles to be identified. They are outlined below.

GENERAL PRINCIPLES

- EIA is a tool to help achieve sustainable development.
- EIA procedures should be integrated, closely, into existing development planning and authorization procedures so that:
  - minimum disruption is caused to existing institutional arrangements; and
  - maximum effectiveness for EIA is achieved by identifying the appropriate 'time/locations' for EIA to be linked up to the existing procedures.
- EIA is a management tool to be linked closely to the project life-cycle and its decision points to ensure the appropriate environmental information is provided at the correct time. There must be constant interaction and feedback between the EIA team and project designers and the proponent to ensure that design/locational changes can be implemented to avoid or minimise adverse impacts to the maximum extent possible.
- Projects should be screened to select those needing EIA, and those for which less detailed environmental study is appropriate, using techniques such as:
  - project lists (with thresholds);
  - sensitive area criteria;
  - preliminary or initial EIAs; and
  - combinations of these techniques.
- EIAs must include an analysis of a number of reasonable alternatives.
- Involvement of stakeholders should occur throughout the EIA process (mechanisms and participants):
  - scoping;
  - interim reports (if prepared);
  - draft/final report;
  - decision-making; and
  - post-decision stage.
- EIAs must be implemented in a multi- and inter-disciplinary manner.
- EIAs must be characterized by integration of social, economic and biophysical environmental impacts to the maximum extent possible.

SPECIFIC PRINCIPLES

- Preparation of ToRs for EIAs should be based on the results of scoping activities to specify:
  - likely significant impacts to be identified, predicted, evaluated, mitigated (to extent feasible) and monitored;
  - alternative designs/locations to be assessed; and
  - work plan for EIA study and schedule of consultations.
- Implementation of EIAs should be according to the ToR:
  - baseline studies focused only on impacts being investigated;
  - use of 'a moving' baseline to take account of other projects likely to be implemented before the project subject to EIA.
  - quantitative predictions of impact magnitude and area/people affected;
  - description of impact characteristics and probability of occurrence;
  - evaluation of significance of impacts, from each alternative, based on clear criteria;

  - comparison of environmental impacts of each alternative and selection of least environmentally damaging option using agreed sustainability indicators; and
  - preparation of an impact management plan containing mitigation measures (with estimate of likely effects), monitoring schemes (technical and institutional aspects) and, possibly, community liaison committees.
- EIA reports (with page limits) should contain:
  - an executive summary;
  - results from EIA implementation;
  - information on data gaps and major sources of uncertainties;
  - technical appendices; and
  - visual aids and easy-to-read text.
- Review of EIA reports requires;
  - criteria for review;
  - identification of reviewers; and
  - mechanisms for EIA reports to be amended.
- EIA reports used in 'final' authorization decision-making should contain:
  - records of decision;
  - statements of commitment regarding impact management; and
  - allocation of accountability for post-approval impact management.
- Post-decision stage and impact management should include:
  - mitigation;
  - monitoring/auditing of impacts and mitigating measures;
  - community liaison; and
  - institutional strengthening and training.

3.2 In the rest of this chapter basic guidance is given on the application of some of these basic principles. Others are considered to be of such importance that they are presented, in depth, in separate chapters. The literature review identified, also, a series of critical and emerging issues in EIA; again, these are described in specific chapters.

AIMS/OBJECTIVES OF EIA

3.3 The most important aim of EIA is to introduce effectively a systematic consideration of environmental issues into all important decision-making stages on specific proposed development activities. Virtually all proposed developments are subject to an authorization process whereby a formal decision, or a series of decisions, is made by an official body on the 'future' of the proposal. Without the appropriate permit, licence or approval a project may not proceed. The authorising agency(ies) takes a variety of factors into account when deciding whether to issue an approval. The role of EIA is to ensure that the environment is one of the factors which is considered in decision-making.

3.4 By the time that a project proponent or initiator has applied for an approval, it may be that a significant number of studies on financial, economic and technical matters have been undertaken. A series of 'internal' decisions will have been taken and, at each point, a decision made on whether the proposed project should be abandoned, amended or proceed directly to the next stage. Projects may be abandoned, after pre-feasibility or feasibility studies, before any formal application for an authorization is submitted. It is important that environmental issues are considered, fully and appropriately, at these stages. It is unwise for any proponent to undertake such studies, omitting environmental issues, and be told, subsequently, to prepare an EIA report. At this stage a site and project design may have become 'fixed' and it is time-consuming and expensive to have to alter, or even abandon, a project if an EIA shows that significant adverse impacts will occur and cannot be mitigated to make them acceptable. This is a waste of time and money for all participants in the authorization procedure.

3.5 EIA, therefore, is a **process** which has influence at many stages and over a considerable period of time. It is **not** an activity which is aimed at producing one set of results for use at one specific decision-making stage. However, there is no doubt that the role of the results of this process (in report form) at the permitting/authorising stage is very important because it is at this point that EIA often enters formal, statutory decision-making systems.

3.6 The overall effectiveness of EIA and related studies is enhanced if they incorporate a systematic analysis of reasonable alternatives. Basically, development objectives can be achieved, often, in a variety of ways. There are two types of alternatives, although the distinction between them is not always clear. There are alternatives to a proposed action, for example changing sites for a conventional power station or, as in the case of a flood control proposal, structural and non-structural options. Additionally, there are alternatives within a proposed action, such as alternative processes, layouts on site or other design aspects. The former type of alternative should be incorporated automatically. Finally, and specifically with reference to EIAs, one of the alternatives should be the 'no-action' option; that is no development. This provides an objective baseline against which the other alternatives can be measured.

SELECTION OF PROJECTS AND APPROPRIATE FORM OF EIA

3.7 All proposed projects should be subject to EIA procedures. It is essential that a decision is made as early as possible regarding the extent of the EIA needed. A common, but not universally used, system is to use categories such as:

- Category 1 - projects not expected to result in any significant adverse impacts and which do not require additional environmental study.
- Category 2 - projects which are likely to cause a limited number of significant adverse impacts unless appropriate mitigation action is taken. The impacts and relevant mitigation actions are well-known and it is expected that such projects can be implemented after a limited environmental study and production of a mitigation plan.
- Category 3 - projects likely to cause a range of significant adverse impacts whose extent and magnitude cannot be determined without a detailed study. Similarly, appropriate mitigation measures cannot be devised until the results of this study have been obtained.

3.8 Some proposed projects may have environmental objectives – for example, reforestation or implementation of a wastewater treatment plant. Such 'green' projects may be environmentally benign or beneficial, in overall terms, but unwanted adverse impacts may occur unless appropriate measures are taken. These projects should not be assigned automatically to Category 1 before an initial consideration of the scale and range of the likely impacts.

3.9 It is preferable that a proponent knows, as early as possible, the type of environmental study needed to ensure that the proposal can proceed through the authorization process speedily.

3.10 A project could be assigned to one of the three categories by a variety of methods. It is important, however, that this decision is made independent of a proponent – for example, by a designated agency. Some important issues to be taken into account are:

- sensitivity of location (for example, proximity of a project to a protected area, a wetland, a flood plain, or an area rich in cultural resources);
- sensitivity of potential impact receptors (for example, schools, valuable crop-producing fields, water supplies, hospitals);
- possible duration and reversibility of the impacts; and
- likelihood of associated or secondary development (such as new access roads, aggregate extraction).

TYPES OF EIA STUDIES

3.11 *Category 1 Projects* - Category 1 type projects do not require any further environmental study beyond the work done to make the initial decision. Projects which could be classed within categories 2 and 3 will need additional study and advice is given on the nature of these studies below.

3.12 *Category 2 Projects* - These projects can be subject to a limited EIA. Basically, for such projects the range of environmental issues needing attention is relatively narrow and their nature/scope can be evaluated without great difficulty. Similarly, there are often easily identifiable and implementable technical solutions to prevent or ameliorate adverse impacts. Technical and other mitigating measures need to be included in any report prepared for a category 2 project. Such reports may be subject to stakeholder review and comment (see section entitled 'Stakeholder Involvement' below). Much of the advice/guidance given below in relation to full or comprehensive EIAs, especially that referring to technical issues, is relevant to reports prepared for these projects and need not be repeated here.

3.13 *Category 3 Projects* - These projects need to be subject to preparation of a comprehensive EIA report. Such a judgement is based on the strong likelihood that a proposed project will result in a range of significant adverse impacts which need detailed investigation and subsequent evaluation. Furthermore, it is likely that specific measures will needed to ensure that, if the project is implemented, minimum environmental damage will result.

3.14 Once it has been decided that an EIA is required it is necessary to specify the issues to be analyzed in the EIA. Early agreement on these matters is essential to ensure that appropriate and cost-effective EIA work starts as soon as possible. The process of reaching agreement is termed 'Scoping'.

SCOPING AND PREPARATION OF TERMS OF REFERENCE (TOR)

3.15 When implementing an EIA for a proposal it is important to ensure it focuses only on significant issues for the different phases of development. In all EIAs it is important to consider both the construction and operational periods. In some cases it is necessary to examine the abandonment or decommissioning phases and, in the case of mineral and related projects, the restoration and after-use phases.

3.16 It is not a cost-effective use of resources to study all possible impacts from a large range of alternatives. Therefore, the most important outcome of scoping is an agreement among the main stakeholders, including the public, on the range of alternatives to be assessed and the most likely significant impacts to be predicted and evaluated. Scoping should be undertaken by the proponent, who will pay all the costs.

3.17 The range of individuals, agencies and organizations to be involved should include as a minimum:

- national government ministries likely to have their areas of responsibilities affected by the proposal (for example, ministries concerned with agriculture, natural resources, transport, health and social welfare);
- local government bodies in whose area a project is proposed or whose area is likely to be affected by the project;
- 'traditional' decision-making bodies (councils etc);
- private sector organizations such as trade associations and chambers of commerce;
- NGOs; and
- representatives of the public likely to be affected by the proposal.

3.18 These stakeholders must be provided with information on the proposal, and its alternatives, to enable them to indicate the issues which concern them. There are many ways for obtaining responses from those consulted in scoping. In the case of governmental agencies and NGOs, responses may be requested in writing and, only when necessary, meetings held. Such meeting may be 'behind closed doors' and involve the proponent and a number of concerned agencies. These meetings may be held after written comments have been received in order to clarify issues. To assist scoping, a first draft of a ToR might be prepared.

3.19 There are many options available for stakeholder involvement (see Chapter 5), for example:

- receipt of written comments only;
- formation of a group of individuals who may be considered to represent the various interests which make up the local community/communities; this group will provide the responses needed by the proponent and meetings may be closed to other members of the public; and
- organisation of a series of public meetings to which anyone may come and offer a verbal opinion/comment.

3.20 Of course, there will be other mechanisms and various combinations may be used. The results of scoping should be analyzed and evaluated and a further draft ToR for the EIA prepared. Usually, if a proponent is responsible s/he will hire consultants to prepare the ToR. However, there is no reason why this cannot be done 'in-house'. The ToR is a very important document as it will determine not only the relevance and utility of the EIA work for project design and management, but also the usefulness of EIA results for decision-making. There are two key components to be included in a ToR:

- the project proposal and its reasonable alternatives (including the 'no action' option); and
- the likely significant impacts to be investigated.

3.21 A ToR should not be considered a 'fixed' or rigid document. As EIA work progresses it may be necessary to change the orientation of work. Agreement between consultants, proponent and an authorising or environmental agency should be reached before any changes are initiated.

EIA WORK

3.22 Basically, EIA work will be concentrated on a systematic prediction and evaluation, for each alternative, of the impacts identified in the ToR. These impacts should be compared with each other and with the 'no-action' option. There should be close collaboration between those responsible for the EIA and staff working on technical design and economic/financial issues. For example, it may be that certain alternatives are abandoned as being too environmentally damaging early in the EIA. A preferred alternative or alternatives may emerge and design and layout be improved through actions taken to 'design out' or reduce impacts. It is not appropriate to provide here detailed technical advice/guidance on methods/approaches for predicting and evaluating impacts. Qualified and experienced staff/consultants will be aware of the most relevant techniques and able to select and use them properly. Below, three issues are discussed as they are neglected, often, in many EIAs.

Environment/Project Interactions

3.23 An aim of EIA is to assess the environmental impacts of a proposed development. In certain cases the environmental impacts of a project can influence the effective and efficient operation of an installation. For example, construction/operation of a dam/reservoir may involve resettlement of farmers and, if it is not well planned, then experience shows that people displaced often return to land near their original homes. In addition, large-scale projects attract many workers (and their families) especially during the construction period. When work ends, some individuals may decide to stay in the locality and settle around the reservoir. The net effect of these decisions may be to increase agricultural activities on the margins of the reservoir. Removal of existing vegetation and replacement with crops may increase erosion and, hence, sediment input to the reservoir. If the land bordering the reservoir is sloping then this effect may be enhanced. Sediment input can shorten the operational life-span of a reservoir thus reducing, significantly, its ability to achieve its socio-economic objectives. In most cases there will be few, if any, impacts of this type. It is wise, nevertheless, to consider the likelihood that a project might be adversely affected through such feedback loops.

Social/Environmental Interactions

3.24 Any EIA study should include a prediction and evaluation of social, economic and health impacts. It is useful to consider whether any social, economic or health impacts may cause further, secondary, environmental impacts. If this is not done then some potentially harmful environmental impacts may be omitted inadvertently from the EIA. Annex 1 provides specific guidance on linkages between these types of impacts.

3.25 An example can illustrate this process. A water resource development caused changes in the hydrological regime of the river downstream of the project. The changes in the quality of water and the flow, reduced,significantly an area of reeds. These reeds were used by local villagers to make baskets and other articles. Selling these products provided an important source of income. Without the resource of the reeds, the villagers had to find an alternative source of income. They did so by exploiting trees which they processed into charcoal for which a market existed. By exploiting this resource they contributed to an already serious problem of deforestation and added to the attendant problems of soil depletion and erosion which accompany deforestation. This chain of events could have been foreseen if the socio-economic importance of downstream natural resources had been investigated and likely impacts predicted. It would have been possible either to have protected the reeds, through controlled discharges, or to have provided an alternative economic resource which could have been exploited without adding to existing environmental degradation.

Associated/Secondary Developments

3.26 Some proposed projects are accompanied by one or more associated developments – for example, a quarry and/or access roads. It is very important to consider not only the 'main' project proposal but also any associated developments in terms of their environmental impacts. Such associated developments need to be considered as components of a single, overall, or combined development proposal.

THE EIA REPORT

3.27 The EIA report is prepared on behalf of the proponent. The proponent is legally responsible for its structure/contents and for ensuring it is available for consultation according to legal requirements.

3.28 The structure/contents of the EIA report should be determined by the ToR. The aim of the EIA report is to provide the authorising agency or agencies with sufficient information to enable a judgement to be made on whether to issue or refuse an authorization, permit or licence. Additionally, it will play a similar role in relation to stakeholders (including members of the public and NGOs) prior to the authorization decision.

3.29 Unlike most technical reports prepared during project pre-feasibility and feasibility studies, EIA reports will be used by non-experts. This factor places considerable responsibilities on those preparing the Report. The Report needs to be written in a way which communicates, effectively, with the likely audience. This means it should be brief (perhaps with a limit of 200 pages – including technical appendices), with a minimum of technical terminology, and be illustrated with good quality maps, charts, diagrams and other visual aids. The EIA report must contain an Executive or Non-Technical Summary which presents the main conclusions and options for decision-making. This Summary should not attempt to summarize all the contents of the EIA report – instead it must only contain the information/choices pertinent to the decision. Again, a page limit may be appropriate – for example, 10 pages or less.

3.30 The EIA report should contain, as a minimum, the following sections:

- Executive or Non-Technical Summary (which may be issued as the document for stakeholder involvement);
- an introduction;
- description of the aims of the project;
- discussion of relationship between the proposed project and current land-use and other relevant policies for the area likely to be affected;
- description of the proposed project and alternatives (including no development). This should be brief and attention paid to the major differences between the alternatives;
- description of the expected environmental conditions at the time of probable project implementation (biophysical, socio-economic etc);
- evaluation of the impacts of each alternative, with clear information on the criteria used to assign significance (also, descriptions of the characteristics of each impact);
- comparative evaluation of alternatives, covering significant adverse and beneficial impacts, mitigation and monitoring measures and identification of the environmentally preferred option if possible using a set of sustainability criteria;
- impact management plan;
- discussion of uncertainties involved in interpreting/using results from predictive methods and analytical techniques and description of gaps in baseline and other data used in the EIA work and included in the EIA report;

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- appendices – all technical information and description of approaches/methods used to provide conclusions in the EIA report should be included in Appendices if not suitable for the main text. Also, Appendices should contain:
  - a glossary
  - an explanation of acronyms
  - a full list of all reference material used
  - a list of the names of members of the EIA team, and
  - ToRs for the EIA and for individual specialists investigating specific impacts.

3.31 Finally, if stakeholder involvement has occurred between scoping and production of the EIA report it may be useful to add a section showing the comments received and the responses made (see 'Stakeholder Involvement' below).

IMPACT MANAGEMENT PLAN

3.32 All EIA reports should include an impact management plan. Should a project which is subject to EIA be implemented (which is usually the case) then the interactions between the project and the environment need to be managed. There is a realisation that the focus of impact management must not only incorporate direct interactions between a project and the surrounding environment (impacts) but also measures to compensate for expected environmental damage. These may be needed at locations distant from a development site, for example, protection of a wetland. This issue is discussed further in the chapter 'Sustainable Development and EIA'. Below, attention focuses on management of impacts directly caused by a proposed development action. A project will cause impacts; it is necessary to ensure that no unavoidable, unacceptable impacts occur. The likelihood of such impacts will have been reduced significantly through the integration of EIA and the project design/preparation activities.

3.33 EIA is, however, a predictive exercise and uncertainties remain which may cause unexpected results. Knowledge of development/environment interactions is not yet sufficient to ensure that EIAs can predict accurately at all times. More importantly, however, the prevention or 'control' of impacts depends on the implementation of mitigation measures at the correct time in the correct way and at the correct place. It is very useful for the proponent/operator and the control authority(ies) to have a clear, written plan of action to guide the impact management work. The process of impact management has three basic phases:

- implementation of mitigation measures;
- monitoring/evaluation; and
- revision of the Plan (via use of results from the previous monitoring and evaluation phase).

This process may be in operation for a considerable period of time (up to 50 or more years possibly), but with varying emphases and intensity of application and revision.

3.34 Impact management requires most, if not all, of the following elements to be in place:

- mitigation measures;
- monitoring schemes;
- contingency plans (in case of emergencies such as uncontrolled discharge of pollutants);
- liaison arrangements with the statutory agency for pollution control, line ministry and representatives of local communities; and
- implementation, when considered necessary, of an appropriate environmental management audit system (see Chapter 2).

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3.35 Of course, in the period following project authorization the Plan may need to be adapted to meet changing regulations/laws and other external circumstances. Nevertheless, it remains the foundation for impact management. Guidance is given below on the various elements which should comprise a Plan.

Mitigating Measures

3.36 Throughout EIA work there will be continuing interaction between the project designers and the EIA team. As soon as significant adverse impacts are identified discussions should be held to see if they can be 'designed out' through changes in project design, location or operation. It may become clear, however, that certain impacts can only be mitigated through the implementation of actions, at the appropriate time, during the construction and operation of a project. Such measures can be divided, broadly, into the following main types:

- preventing or minimising impacts before they occur by limiting the extent or timing of an action and its implementation;
- eliminating or reducing an actual impact over time by maintenance or contingency planning operations during the life of the project;
- rectifying an impact by repairing, rehabilitating or restoring the affected environment;
- compensating for an impact by replacing or providing substitute resources or environments; and
- maximising beneficial impacts through specific additional actions.

3.37 The focus of mitigation should be on significant adverse impacts and on beneficial impacts. Once these have been dealt with then attention can be turned to impacts which are adverse, but not considered to be significant. Some of these may be mitigated easily — others may not. It is not possible to give firm guidance on the extent to which adverse impacts should be mitigated. Decisions on this matter will be project-specific and will take account of various issues such as cost, views of the stakeholders involved in the EIA work (including consultations within government and members of the public) and practicality.

3.38 In the Plan it is useful to specify, in detail, the characteristics of the mitigating measures to be implemented for the 'target' impacts – in particular:

- description of the mitigation action;
- time/place for implementation;
- expected results;
- responsibility for implementation (named individual(s) in operator's organisation or in other linked entity);
- monitoring strategy needed to check on implementation and level of performance success; and
- reporting procedures within operator's organisation and to a control authority and community liaison committee (if formed).

3.39 Mitigation need not only be an additional cost to proponents. Mitigation measures to clean up effluent streams can be the catalyst for consideration and future implementation of recycling and recovery operations (with possibly a marketable by-product) which can be a cost saving. In addition, the more impacts are mitigated the cleaner and healthier will be the working environment. Such working conditions are associated with higher levels of productivity than those which occur in dirtier and less safe working conditions (all other factors being equal).

Monitoring

3.40 There are three main types of monitoring which can be undertaken for a project:

- compliance monitoring (amount/content of effluent streams);

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- mitigation monitoring (whether mitigation actions have been implemented in accordance with an agreed schedule and are working as expected); and
- impact monitoring (scale and extent of impacts caused by the project).

Mitigation and impact monitoring are of most relevance and importance for EIA.

3.41 Monitoring is of particular importance if a decision is made to proceed with a project, because of expected benefits despite considerable uncertainty concerning the scale and significance of one or more adverse impacts. Also, it is important in situations where local people may be concerned about the impacts of a project on a local economically important resource – for example, a fishery– even if the EIA work indicates that no significant impact is likely. In such situations, agreement to implement and fund a monitoring programme can be important in reducing public fears and hostility regarding a proposed project. At the same time, the monitoring data will function as an 'early-warning' system indicating if an impact is occurring and allowing action to be taken to remedy the situation if data show existence of a trend likely to result in an unacceptable impact in the near future.

3.42 Careful and well-considered thought needs to be given before monitoring recommendations are formulated. Monitoring can be expensive, particularly in relation to ecological impacts. Therefore, it is important that consultations take place between interested groups/agencies and, when appropriate, representatives of the public, to discuss necessary impact monitoring. Important issues to be considered include:

- identification of impacts to be monitored in priority order;
- design of an appropriate monitoring programme for each identified impact (this may need additional expert advice, for example from a biostatistician in relation to ecological or health impacts);
- likely duration of the individual monitoring programs;
- the institutional system by which monitoring data will be collected, collated, analyzed, interpreted and action taken, if necessary, to prevent or reduce unwanted impacts; and
- cost of overall monitoring recommendations.

3.43 The last two issues are very important. For monitoring to be successful it needs to be technically adequate and be part of an effective institutional framework which can make use of the data to take appropriate action. There is no point in collecting data which is 'shelved' because there is no institutional arrangement within which it can be utilised. The cost will depend on the decisions made in relation to the number of impacts to be monitored, the nature of the individual monitoring schemes, their duration and the type of institutional system needed to use the data.

3.44 In formulating monitoring programs it is very helpful to keep in mind the direct and clear relationship between baseline data collection (through monitoring of selected impact-related parameters) and impact monitoring programs. In most EIAs, work done to establish baseline conditions at the beginning of EIA implementation can be continued once a final authorization decision is made, as part of impact monitoring. For example, establishing the baseline water quality of a river, and the nature of its biota, for a pulp mill EIA may require a monitoring programme. It is likely that, should authorization be given, the possible impacts of an effluent discharge on water quality would need to be monitored. It may well be that the baseline monitoring programme could be continued throughout the entire construction phase and for a specified period of time into the operational phase.

3.45 Impact management programs are undertaken to protect the environment and the interests of local people. It is increasingly important that impact management programs are socially responsive and credible to the public. It is not a question of 'selling' the impact management plan to the public – rather there is the need to involve them. It is often useful to initiate a forum whereby the local community, the project operator, and the relevant control agencies can meet to discuss issues and problems and agree on possible 'solutions'. This can mean that community members are informed of the results of monitoring/checking activities, allowed to participate in decisions regarding interpretation of impact data and on the nature of any actions needed after analysis and interpretation of monitoring results. Community liaison arrangements are needed, perhaps, for only the most controversial proposals, but there should be a consideration, on a case-by-case basis, of whether such a system is needed.

STAKEHOLDER INVOLVEMENT

3.46 Experience of EIA, globally, has shown that stakeholder involvement and increasingly, participation, is an important contributor to the overall utility of EIA reports in decision-making. Limited involvement, particularly with communities likely to be affected by a proposal, usually leads to local political problems with grievances being expressed at the end of a study. Depending on the strength of local feeling, the result might be additional work, a public hearing and consequent delays and additional costs. The role of stakeholder involvement is discussed in Chapter 5.

REVIEW OF EIA REPORTS

3.47 The completed draft/final reports should be passed to an environmental agency for technical review. The agency will decide if it requires specific technical expertise to assist it with the review. The main objective of review is to examine, critically, whether the following criteria are met:

- full response to the ToR – if the ToR was amended during the course of the EIA work an explanation should be presented;
- an executive or non-technical summary is included;
- the 'no-project' baseline situation is adequately described;
- the policy planning context for the area, in which a proposal will be located is described (if such a policy context exists);
- significant adverse and beneficial impacts are identified, and described, with a justification for the 'significance' decision;
- alternatives have been assessed equally and in a comparative manner;
- the environmentally preferred alternative is identified with reasons for the choice;
- stakeholders were involved in the EIA process;
- data sources are properly identified and referenced; and
- the specific methods/techniques used to predict and evaluate impacts are described and data limitations are identified.

3.48 If an EIA report is not acceptable technically, the agency should require additional work before it can be accepted for decision-making purposes. Should this occur then the proponent must ensure that this work is carried out. The revised report should then be further reviewed by the agency until it is considered to be acceptable.

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4. INTEGRATIVE ASSESSMENT AND DECISION-MAKING

INTRODUCTION

4.1 There are four main types of integration which involve EIA:

- integration with national or local decision-making processes (dealt with in Chapters 2 and 6);
- integration with other environmental management tools and approaches;
- integration with the appraisal process (feasibility studies); and
- integration of environmental, social, health, and economic impacts within EIA.

4.2 In this section only the latter three topics are considered. These are basically approaches to help achieve maximum integration and utility of EIA within all aspects of the development process, particularly in the context of physical development projects.

INTEGRATION WITH OTHER ENVIRONMENTAL MANAGEMENT TOOLS AND APPROACHES

4.3 The need to improve environmental management in the development process, and move the process toward sustainability, has led to the formulation and implementation of new concepts, systems and techniques. The relationships between them is often unclear and the terms used to describe them do little to assist wider understanding of their nature and scope. It is important to describe briefly those complementary tools which relate directly to EIA, and to establish the basic aspects of the relationships between them. There are overlaps in coverage and many are still evolving; therefore the relationships between them will change over time. Below basic definitions on the main techniques are provided, based on a series of definitions listed by the UNEP Industry and Environment Office (1995).

Environmental Auditing

4.4 Essentially, auditing involves a systematic procedure for checking, testing or evaluating relationships between an existing installation or facility and the environment. Environmental auditing can be applied only to operating (or recently operational) installations. There are many types of audit and the term is used very loosely with no general agreement. The main types are:

Liability Audits

4.5 These are often undertaken when an organisation wishes to acquire land and buildings to expand or re-start production. These audits may exhibit similarities to EIAs (see section on 'Privatization' in Chapter 6).

Activity Audits

4.6 These are undertaken to improve environmental performance of specific activities such as waste generation and disposal or energy usage. The aim is to minimise waste/energy use to protect the environment and make facility operations more cost-effective.

Management Audits

4.7 Increasingly, companies and other organizations are establishing environmental management systems as integral components of overall business management practice (for example, the system established by the International Standards Organisation - ISO 14000 series). These systems require organizations to establish overall environmental objectives and plans containing strategies and activities to

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achieve them. Periodically, performance is reviewed to determine the extent to which they have been achieved. The regular checking of performance against the objectives is often referred to as environmental auditing. This type of audit may have close links with EIA results in the post-approval stage of the project life-cycle.

EIA Audits

4.8 An evaluation of EIA performance – for example, a comparison of actual impacts (once a project is operational) with predicted impacts (as identified and described in an EIA report) to help improve future EIAs – may be undertaken. Alternatively, the procedural aspects of a selected number of EIAs may be checked and evaluated to establish whether they conformed to regulatory requirements. These evaluations of EIAs are often termed EIA audits.

Technology Assessment

4.9 This is a technique to identify and describe the expected impacts of a new technology (for example, mobile telephones or portable computers) on society. It can be national or global in coverage. It can be used by governments to analyse policy options and by companies to select markets. Environmental technology assessment (ETA) analyses, specifically, impacts of new technology on human health, natural resources and ecosystems. ETAs can make use of EIA and life-cycle assessments to assist in identifying impacts and means to avoid adverse consequences and enhance benefits.

Life-Cycle Assessment

4.10 Life-cycle assessment is a systematic examination of the environmental impacts associated with a product (for example, a new washing powder) throughout its life. Thus, the assessment examines extraction, transport and processing of raw materials, manufacturing processes, transport and distribution of the product, use and re-use/re-cycling and final disposal. The objective is to reduce adverse environmental impacts at all points in its life-history.

INTEGRATION OF EIA WITH FEASIBILITY STUDIES

4.11 All governments are committed to achieving economic goals and objectives to improve the standard of living and quality of life of their citizens. Actions to achieve these ends require the allocation of scarce human and financial resources. It is very important to ensure the maximum economic return for the resources invested. Proposed development projects need to be assessed, systematically, to assist decision-makers choose between competing uses of resources. A common method for comparing the costs and benefits of alternative resource allocations is cost/benefit analysis (CBA) using money as the unit of measurement. The aim is to determine which project option contributes most to the growth and efficiency objectives of an economy, independent of the expected beneficiaries (such as the owner or shareholders of a company). Basically, does one option create more net benefits than any other mutually exclusive alternative including the 'do nothing'?

4.12 Economic analyses and financial analyses integrate cost and benefit data and compare the alternatives. An economic analysis may rely solely on a cost benefit analysis in terms of measurements such as net present value (NPV), internal rate of return (IRR) and cost benefit ratio. Financial analyses of proposed projects are undertaken particularly by the private sector and, increasingly, by parastatals due to the increasing trend to privatization. A financial analysis includes a prediction of the money profits which will be received by the project operator to enable financial obligations to be met and to fund future investments. In most developing countries and economies in transition, economic analyses and use of NPV and IRR are, on balance, likely to predominate over financial analyses, because of the likely continuing predominance of public sector investment.

4.13 CBA should deal with all costs and benefits; however only limited progress has been made in developing acceptable and agreed means of incorporating environmental impacts because of:

- ignorance of impacts;
- difficulties in quantifying impacts;
- difficulties in assigning significance; and
- problems in valuing the impacts even when known and quantified (when markets are absent, incomplete or imperfect thus making allocation of a monetary value difficult).

4.14 To a certain extent, EIA came into existence because of the perceived limitations of existing project evaluations, usually based on CBA and engineering appraisals. Such appraisals were not able to incorporate the environmental consequences of development in their 'calculus'. This led to unexpected and significant adverse environmental impacts which were expensive to ameliorate. EIA was considered, by many, as a means of adding the environmental dimension to decision-making. In addition there was a view (often strongly felt) that economic evaluations could not, in principle, incorporate specific important impacts because many features of the environment did not and could not have a market price. In addition, monetary values would reflect only the value(s) of various groups and individuals which had an artificial control over market prices, thus ensuring that social inequalities were embedded in decision-making.

4.15 Thus, for many years there was little conceptual and professional contact between the EIA and economic evaluation 'worlds'. However, due to changing circumstances, the benefits of being able to evaluate certain environmental impacts in monetary terms have been recognized. At the same time, considerable work has been done to advance existing economic evaluation approaches and to develop new techniques. There is still no general agreement, however, on the most effective link between EIA and economic evaluation approaches, particularly in terms of evaluating all environmental impacts.

4.16 Despite this lack of formal consensus on the 'ideal' link, it is clear that the benefits of integrating EIA into feasibility studies, to the maximum extent possible, are understood increasingly. For example, the World Bank states in the *Environmental Assessment Sourcebook* that 'EIA is fundamentally a part of the feasibility study'. This link will assist incorporation of EIA findings into site selection, technology selection, design and implementation and operational management systems. It is true that the Bank suggests, in special cases, that the EIA team should not be linked directly to the project proponent or the feasibility team, but should ensure that they work closely with it. The Bank recommends, also, that efforts and funds should be expended on an environmentally-oriented economic analysis early in the project life-cycle because critical choices are often made early.

4.17 The key to better practice in feasibility studies does not only lie in the development of better and more acceptable techniques for valuing environmental impacts – although that will be important. Instead, it is to be found in the creation of a wholly integrated project appraisal method which combines, as far as possible, economic, financial, engineering and environmental analyses in a comprehensive, integrated feasibility study. It is not a question of improving either CBA or EIA by mixing and matching components of these appraisal methods to strengthen or improve one of them. Instead, it is necessary to move ahead, more radically, by creating a new appraisal method which utilises the strengths of both EIA and CBA. Further, the results of using this 'new' appraisal method can be best used in a policy and decision-making context which is informed regularly by data obtained from an operational system of national environmental accounting and a set of sustainability criteria. The links between EIA and sustainability and guidance on good practice in this context are presented in Chapter 8.

4.18 CBA has been criticised for providing the results which suit the needs of the proponent and not providing the type of reliable and justifiable information which is desired by decision-makers. In some cases, the data and assumptions (raw material inputs and values, workforce size and phasing) upon which CBAs are based, can be manipulated to provide a specific result. Since CBA results, generally, are not publicly available it is not easy for such distortions to be identified and remedied. Similar information is required for assessing social and economic impacts within EIA. Since EIA reports are publicly available, it is necessary to show the bases upon which impacts have been predicted. They have to be justifiable and defensible to withstand public scrutiny and review, providing a 'double check' on key assumptions in appraisal.

4.19 It is quite common for CBA to identify the 'winners and losers' in terms of the distribution of costs and benefits. Some environmental impacts such as land take or change of land use may be easily assessed in CBA, without the assistance of EIA. However, the cumulative effect of multiple impact pathways on a habitat, species or a community cannot be determined without EIA. Information from an analysis of the differential distribution of such impacts can be a very useful input to assist a systematic and comprehensive identification of 'winners and losers'.

4.20 EIA, also, increasingly requires the involvement of stakeholders, particularly communities likely to be located near a proposed project. This will enable the EIA team to identify the concerns of such groups, especially in relation to the role of natural resources in maintaining local livelihoods. This information can be used to determine the significance of a resource even though its products may not be bought and sold in a monetary economy. Interactions between economists and EIA team members will enable the former to take account of this factor when undertaking their analyses. Thus, an integrative appraisal approach will assist identification of:

- winners and losers;
- differences between winning and losing groups; and
- market distortions and means of overcoming them

and help remove some of the deficiencies of the current situation. Unfortunately, such information is not presented, currently, to decision-makers as it often is not clearly identified in either a CBA or any accompanying EIA. In all EIA systems, attempts should be made to encourage use of economic analyses with EIA to form better integrated appraisals.

4.21 It is clear, however, that not all environmental impacts can be quantified and/or valued in monetary terms. Such impacts can be expressed in both qualitative and quantitative terms and considered with the NPV/IRR or cost/benefit ratio of projects in decision-making. In some cases it will be obvious that the preferred option (in CBA terms) is, also, environmentally the best alternative. Unfortunately, this situation does not always occur and the environmentally least damaging option cannot be identified, nor is it easy to be certain that the environmental advantage of one option might override a small economic advantage in favour of another alternative. Clearly, it would be beneficial if a mechanism could be found to aggregate all results from an integrated assessment of one option into a single numerical index which could be compared with indices derived in a similar way for its alternatives. Considerable efforts have been made to devise such methods – the most well-known being decision analysis based on the principles of multi-attribute utility theory. This is a complex method which can be used to weigh all outcomes (assign relative importance) and combine them to form a numerical index. This method is based on identifying the preferences of decision-makers or other stakeholders and incorporating these as the major determinants of the weighting scheme. The probability of outcomes can be incorporated, as can sensitivity analyses to test the extent to which altering the weights will change the overall result. By this means it is possible to test the extent to which it is possible to be confident that the overall result provides a sound basis for decision-making.

4.22 There is no doubt that these methods do assist in selecting a preferred option, but there are a number of significant difficulties in their use. They are technically complex and require specialists to implement them. It is virtually impossible to initiate a meaningful stakeholder involvement process on appraisal reports whose final results are obtained after use of such methods. The selection of the preferences and weights can be politically difficult and contentious, although the ability to implement sensitivity analysis can provide results for different sets of values (NGOs, local people and government agency staff). Of course, the selection of alternative weighting schemes as part of the sensitivity analysis has to be based on a careful identification of the relevant stakeholders. EIAs can ensure that they have been adequately identified.

4.23 In global terms, such methods are used infrequently. It would seem that their use should, perhaps, be restricted to studies which examine alternative technologies or sites for development in which the aim is to narrow the options to a manageable number. For example, a nation-wide search may be undertaken to identify a 'bank' of potential hydro-power or power station sites. The output might be 3 or 4 sites which would be considered in more detail when a specific power station proposal was proposed.

INTEGRATION WITHIN EIA

4.24 In the early years of EIA, environmental impacts were considered to be only impacts on the natural, biophysical environment (such as effects on air and water quality, flora and fauna, noise levels, climate and hydrological systems). The focus on biophysical impacts alone did not last long. Since the mid-1970s, additional types of impacts have been identified as requiring analysis and evaluation prior to their consideration in decision-making. The institutionalization of EIA, with its public disclosure and consultation processes, seemed to act as a magnet to individuals, groups and agencies who wanted other kinds of impacts to be incorporated in decisions. They were assisted to some extent by the term 'environment' which, increasingly, was defined broadly to incorporate social aspects. Since the mid 1970s there has been a process, therefore, of widening the scope of EIAs to incorporate other related issues/impacts.

4.25 The process of incorporating various kinds of impact into EIA has been *ad hoc* with specific changes being accepted in certain countries, sometimes only temporarily. In other cases the change has been permanent and, through time, the altered practice has been accepted elsewhere. For example, in the USA in the late 1970s/early 1980s there was considerable work done to promote and undertake urban/family impact assessments. However, Federal political changes and altered priorities resulted in a rapid decline of this work. The opposite situation has occurred with reference to social and health impacts. The inclusion of these impacts in EIAs has been consolidated and there is a wide agreement that they are necessary and logical components of EIAs. It must be stated, however, that this agreement is not universal - there are countries where social impacts are not assessed or where the range of social impacts which may be considered in EIA is very limited.

4.26 Over the past 25 years therefore, there has been a tendency to use EIA systems as vehicles for analysing a variety of impact types within a single framework. In some cases, EIAs are supplemented by related, but separate, specific studies (and reports) on social/health impacts when the latter are considered to be particularly important for decision-makers. Despite a lack of internationally consistent practice, it is possible to identify a majority 'position' that integrated assessments, potentially covering a wide range of impacts, are needed and that EIAs are the best available mechanism for implementing them.

4.27 There is no scope in this document to provide detailed advice and guidance on all the impacts which might be included in an EIA report. Such advice can be obtained from the technical literature (manuals, guidance etc) or from more widely available textbooks such as Vanclay and Bronstein (1995) and Morris and Thérivel (1995). Given that all EIAs contain information on biophysical impacts, it may be assumed that most people involved in EIA have practical knowledge and understanding of these issues. On this basis, it is considered that a more effective contribution toward encouraging integrated assessment, within EIA, will be made by focusing on:

- social impacts;
- economic and fiscal impacts;
- health impacts; and
- risk and uncertainty.

Issues of risk and uncertainty are included because they are of direct concern to local people and due to increasing interest in dealing with the aspect of probability in relation to all impacts. Guidance is provided in Annex 1.

5. ROLE OF STAKEHOLDER INVOLVEMENT

INTRODUCTION

5.1 There is no doubt that the involvement of stakeholders is a vital component of both successful EIA systems and specific EIA studies. It has been an integral part of EIA practice since 1970. Different terms have been used to describe this activity – for example, consultation and participation.

5.2 Who are stakeholders? Generally, this phrase refers to the following:-

- local people (individuals) and communities (for example, villages) likely to be affected by a project;
- project beneficiaries (who may **not** be local);
- national and local government agencies with responsibility for management of natural resources and welfare of people likely to be affected by a project;
- NGOs active in the local area or with an interest in natural resources/social welfare; and
- the interested 'public' in the country of any external financing agency(ies).

These individuals, groups or organizations represent the minimum to be involved in EIA. Often, EIAs provide an opportunity for others to be involved – for example, research scientists who may be experts on aspects of the locality to be affected.

5.3 There are, basically, three main types of involvement in EIA. First, there is information dissemination. When this occurs, the proponent provides information to the stakeholders on a proposal, once only or at regular intervals. The flow of information is 'one-way' and there is no provision for responses to be taken into consideration.

5.4 Secondly, there are consultations involving information exchange between the proponent and stakeholders in a two-way process. Also, during consultations there are opportunities for the stakeholders to express their views on issues related to the proposal. The proponent and/or authorising agency is not bound, however, to take account of such views in decision-making, although they may do so if they consider it to be appropriate. Although often not required formally, consultations can include mechanisms for feedback between a proponent/agency and stakeholders so the latter may learn the extent to which their views have been taken into account in decision-making.

5.5 Finally, there is participation. As the term indicates, this requires shared involvement and responsibility. Basically, it implies an element of joint analysis and control over decisions and their implementation. In participatory decision-making there is no single source of ultimate control or authority. The participating parties must discuss and reach a decision by means of an agreed process – for example, by mediation and consensus-building.

5.6 Globally, the role of stakeholders in EIA is expanding. There is a definite momentum from consultation toward participation. Strictly speaking, consultation can mean that stakeholders have no formal influence on decisions, whereas participation means shared control and, therefore, power. There is a 'middle ground' between these two positions which governments should identify and encourage decision-makers to explore in individual EIAs. Participation should be the aim when countries are introducing, or amending, EIA procedures. In this section the generic term 'involvement' will be used to describe all processes whereby stakeholders are linked to EIAs, recognising that practice varies from country to country and that participation (as defined above) is used increasingly.

NEED FOR STAKEHOLDER INVOLVEMENT

5.7 Why is stakeholder involvement through consultation and participation considered to be an essential part of EIA? Experience has shown that the following benefits occur:

- improved understanding of the potential impacts of proposed projects;
- identification of alternative sites or designs, and mitigation measures;
- clarification of values and trade-offs associated with these different alternatives;
- identification of contentious issues (and a possible forum to resolve them);
- establishment of transparent procedures for implementing proposed projects; and
- creation of accountability and a sense of local ownership during project implementation.

5.8 The involvement of the public in development (whether at project identification, appraisal or implementation stages) has been shown to be beneficial. Pretty (1993) cites evidence from the Philippines in which the success of two similar irrigation projects in the Philippines was evaluated (one scheme involved participation, the other did not). It was found that yields were 10-22 per cent higher in the project with participation and that water use and maintenance of structures were more efficient.

5.9 Given that involvement is considered essential in EIA, how can it be improved? The difficulties and constraints which characterise involvement in many countries are well-known. These are:

- identification of all interested and affected parties;
- linguistic and cultural diversity making mutually intelligible communications problematic;
- illiteracy;
- lack of local knowledge and comprehension regarding the scale and nature of certain types of development projects;
- unequal access to consultations (for example, women); and
- time/cost implications of dealing with these difficulties.

5.10 Due to these difficulties, it has been easier to involve NGOs than local communities and, therefore, involvement has been, in many cases, dominated by such organizations acting as substitutes for local people. Although convenient, there are two major drawbacks to an over-reliance on NGOs. First, they may not always represent, accurately, the views of local people. Secondly, continuing involvement in EIAs can divert scarce resources away from their remit and day-to-day activities.

5.11 Stakeholder involvement can play an important part in ensuring the success of a proposed development initiative, even if an EIA is not undertaken. It is most beneficial if it occurs at the time of project identification. This is of particular relevance if a government decision has been made to assist the overall socio-economic development of a particular area. A government may have some specific projects in mind and can proceed on that basis. Alternatively, it can ascertain whether local communities/organizations have their own ideas for development projects and act accordingly. Involvement at the project identification stage is encouraged, actively, by many lending and donor institutions and can be extremely beneficial in the context of government or public-sector initiatives. In terms of the private sector, there is much less opportunity for such involvement because of the over-riding need for confidentiality and profitability. Future EIA work can be made easier and more

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effective if stakeholder involvement has occurred earlier at the stage of identifying the project concept.

5.12 Once a project has been identified and an EIA is to be implemented, involvement can occur at various stages. The nature and timing varies from country to country. Increasingly, the first stage is undertaken during scoping and prior to the preparation of a ToR for the EIA.

IMPROVING PRACTICE IN STAKEHOLDER INVOLVEMENT IN EIA

5.13 It is very important that a plan or framework for stakeholder involvement is prepared **before** EIA work begins. It is essential to have such a framework or plan because there is an understandable tendency for EIA practitioners to focus their attention on the technical aspects of the EIA work to the detriment of the consultative process. This will occur even if an anthropologist or rural sociologist has been included in the team to deal with social impacts and/or the involvement process. Often such experts are marginalized in large teams of engineers, planners or environmental scientists and, if no agreed framework for involvement exists, they will face difficulties implementing it effectively. This will occur even if there has been an informal or even formal agreement that involvement will take place.

5.14 It is preferable if the outline, or the basic features, of a stakeholder involvement programme is an integral component of the ToR. In this way the EIA can benefit from involvement, at specific times, and those involved can be kept informed of the EIA's progress and the ways in which their concerns and views have been considered and dealt with in the EIA. If it is not possible to integrate a plan for involvement into the ToR then it is best to prepare a separate document, which is based on the ToR, outlining the programme for involvement. Preparation of this document should be the responsibility of the EIA team leader acting with advice and input from a social scientist with knowledge of local cultures and techniques of stakeholder involvement. By this means the likelihood of cost-effective involvement is increased substantially. Box 6 presents an example of a stakeholder involvement programme which had both consultative and participatory elements as many of the results determined the direction and scope of the EIA work. The EIA was implemented to predict the impact of alternative development scenarios on an area within a 30km radius of the Victoria Falls on the border between Zimbabwe and Zambia. It shows the stakeholders identified and the techniques to be used to obtain their views. It is presented as an indication of the type of overall approach which can be used for stakeholder involvement (it is perhaps a little more complex than would be expected, normally, because of the trans-boundary aspects!).

5.15 To prepare a plan for involvement will require consideration of the following aspects:

- objectives of the EIA;
- identification of stakeholders and, if any are transhumant or pastoral, mapping of their routes in time/space;
- budgetary/time constraints and opportunities;
- identification of appropriate techniques to involve stakeholders;
- traditional authority structures and decision-making processes;
- identification of approaches to ensure 'feedback' to stakeholders;
- identification of mechanisms to ensure consideration of stakeholders' views /opinions /suggestions by the study team; and
- need to guide involvement to focus on issues.

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5.16 It is very important to formulate a strategy to maintain a continuing interest, on the part of stakeholders, in particularly lengthy EIAs. It may be that local people will rapidly lose interest if they feel that there are few visible benefits for their communities from their involvement in the EIA.

5.17 There are numerous techniques which can be used to involve stakeholders, especially the public, in EIA. These include:

- **public meetings** (these are 'open' with no restriction as to who may attend); and
- **advisory panels** (a group of individuals, chosen to represent stakeholder groups, which meets periodically to assess work done/results obtained and to advise on future work)

Box 6 : Stakeholder Involvement Programme : Victoria Falls EIA and Master Plan

The objectives of the stakeholder involvement programme were as follows:

- to inform them of the EIA study, its objectives, work to be done, timing and outputs (EIA report and outline Master Plan);
- to obtain their views on important issues and concerns to be investigated in the EIA;
- to obtain their views on future actions which could be taken to manage the Falls area;
- to keep them informed of the progress of the EIA and Master Plan preparation actions and the manner in which their concerns/recommendations were considered in preparing the Master Plan.

This programme of involvement was aimed, primarily, at local residents (in their various communities and groups), NGOs with a local base, also the private sector, tourist visitors and local and national government agencies.

Approach

First, those groups likely to be most affected by expected economic and environmental changes in the Falls area were identified. Two anthropologists with local knowledge of conditions in the study area and who spoke the main local languages in addition to English were responsible, with the team leader, for identifying the groups and the appropriate involvement techniques.

There were four broad categories of residents and interest groups each needing special techniques. First, there were the indigenous communities, mostly village-based under traditional authority, with well-established institutions and customary decision-making processes. These were used as a mechanism to involve local people. It was not possible to consult all villagers; therefore, a representative sample of villages was identified and involvement undertaken via the chiefs or headmen. In a number of cases open public meetings were arranged to allow individuals to participate. It was expected that both genders would have equal access to the involvement process as a number of communities are matrilineal and women have a respected status.

Secondly, there were residents not part of traditional settlements, including most of the residents of Victoria Falls and Livingstone towns and the ZESCO township near the Falls in Zambia. Such communities have many diverse interests and their social organisation is correspondingly more complex. Views were obtained via a range of voluntary organizations and other groupings selected to represent a cross-section of interests. For each selected organisation, two or three representatives were interviewed in a semi-structured way. Organizations consulted included community development and resource user groups (for example, the curio sellers in Zambia), neighbourhood and/or residents' associations, company settlements (ZESCO), co-operatives and church- and gender-based groups.

Two open public meetings and a series of open houses were held in Victoria Falls town and Livingstone to provide a further opportunity for local opinions to be obtained. The anthropologists ensured that the views of the urban 'poor' were consulted. This was achieved by a series of interviews with residents in high density housing areas or 'informal' settlements.

Another important social category included those closely linked, and dependent on the private sector. In Zimbabwe this is dominated by companies and individuals prominent in the provision of accommodation (hotels, lodges and camp areas) and activity-based pursuits (safari operators, tour companies). In Zambia, the situation is more complex. Livingstone is an important regional economic centre with parastatal and private sector industries. In Zimbabwe the views of the private sector on the main issues facing the Falls area are well-known. The Zimbabwe Council for Tourism has conducted its own studies and monitors the views of visitors on a continuing basis. The opinions of the private sector in Zambia were less well-known and special effort was needed to ensure that they were obtained. This involved identification of trade associations and organizations such as Chambers of Commerce and conducting semi-structured interviews with relevant individuals. The views of visitors to the Falls area, also, were obtained by a structured questionnaire administered on a random basis by trained interviewers.

These activities were supplemented by a media campaign involving the local press, radio and TV to raise general public awareness of the study and it aims.

- **open houses** (a manned facility in an accessible local location which contains an information display on the project and the study. Members of the public can go in to obtain information and make their concerns/views known);
- **interviews** (a structured series of open-ended interviews with selected community representatives to obtain information/concerns/views);
- **questionnaires** (a written, structured series of questions issued to a sample of local people to identify concerns/views/opinions. No interviewing may be involved); and
- **participatory appraisal techniques** (a systematic approach to appraisal based on group inquiry and analysis and, therefore, multiple and varied inputs. It may be assisted, but not controlled or directed, by external specialists).

5.18 There are a number of basic principles to be followed when undertaking stakeholder involvement:

- sufficient relevant information must be provided in a form which is easily understood by non-experts;
- sufficient time must be allowed to individuals to read, discuss and consider the information and its implications;
- sufficient time must be allowed to enable views and opinions to be presented;
- a response must be provided to issues/problems raised or comments made by individuals (this feedback is very important if public confidence in the involvement process and the EIA system is to be maintained); and
- selection and timing of venues or contexts must encourage the maximum attendance and free exchange of views (including attendance of those who may feel less confident about expressing their views, such as women and older people).

5.19 The main challenge is to identify and involve individuals and groups, likely to be affected but whose interests are not necessarily reflected by local/national government organizations or NGOs. It is essential to identify representatives for such affected individuals and groups and to obtain their input. Examples of such representatives are:

- **traditional authorities**, such as village headmen, tribal elders, and religious leaders;
- **voluntary organizations**, such as local community development or users' groups, kinship societies, recreational groups, neighbourhood associations, labour unions, gender groups, ethnic organizations, and co-operatives; and
- **private sector representatives**, such as private business interest groups, trade associations, or professional societies.

In many situations it is very important to obtain the views of women because of their varied social and economic roles. Special efforts need to be made to identify the best means of obtaining their views.

5.20 It is relatively easy to identify those stakeholders who have a formal responsibility for the management of natural resources and human welfare. Usually, there will be local or provincial government entities (for example, town or district councils) and perhaps local outstations of national government ministries, departments or agencies. Of particular relevance will be those concerned with:

- land use planning and/or management;
- natural resources (water, minerals);
- cultural heritage;
- health;
- social infrastructure (for example, education);
- transport;
- agriculture/forestry; and
- wildlife.

5.21 This list is not exhaustive and the appropriate ministries and departments should be identified for each EIA. In some countries there will be a need to involve relevant parastatals, such as those concerned with water supply, power generation and transmission and tourism, if their interests may be affected by a proposal.

5.22 Similarly, it is relatively simple to identify NGOs. Those active in local community and/or economic development are likely to have a local presence or office. In many cases it may be necessary to contact a national office, likely to be located in the capital city. Sometimes it is necessary to determine who has 'standing' *vis à vis* an EIA. For example, an international environmental NGO may have a national presence, but not be working in the study area. The question then arises whether or not it should be involved. There is no simple, correct answer. It will depend on specific local/national circumstances. International NGOs should never be used as a substitute for a local entity.

5.23 There is no single 'correct' approach to stakeholder involvement. The choice of techniques and the 'mix' employed will depend very much on the circumstances of each EIA. It is imperative that the advice of an anthropologist/rural sociologist (with local knowledge if at all possible) is used and a plan is prepared. Further, it is very helpful if widespread publicity regarding the EIA and the programme for stakeholder involvement can be generated through the media, especially via radio and newspapers.

5.24 Once the plan for involvement has been prepared the EIA work can begin. Current EIA practice shows two main stages at which involvement occurs: scoping/ preparation of ToR and on the release of the draft/final EIA report. However, depending on circumstances and opportunities it is possible to be more innovative and extend involvement to additional EIA phases. The possibilities and benefits are outlined, briefly, below. The context of specific EIAs will determine the scale, timing and nature of involvement, but it is useful to consider the implications of all options before selecting a preferred involvement strategy which suits a particular EIA.

5.25 The stages at which involvement may occur are:

- scoping to prepare the ToR for an EIA;
- project appraisal (during conduct of the EIA/feasibility studies) at release of preliminary/interim EIA report and/or the draft/final EIA report;

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- project implementation (application of EIA recommendations); and
- project evaluation (extent to which a project has achieved its objectives).

5.26 Involvement at these different stages may have a variety of objectives and requires appropriate approaches and strategies. Also, the extent to which the involvement becomes participatory – that is, when stakeholders are able to influence or control decision-making – will vary according to the phase or stage of the involvement process.

SCOPING

5.27 Scoping is the term used to describe the process, undertaken prior to preparation of ToRs, which has the following objectives:

- to inform participants of the EIA and its objectives;
- to define time/space boundaries for the EIA;
- to identify feasible alternative project designs and locations;
- to provide guidance on the nature and scale of the issues, especially likely significant impacts, to be examined;
- to obtain local knowledge on the characteristics of the local area; and
- to define the essential components of a plan for involvement.

5.28 Scoping can be undertaken in a number of different ways. It may involve a meeting or series of meetings 'behind closed doors' involving only the proponent and a number of concerned agencies. Alternatively, it may be 'open' with public meetings (open to all local interested people and groups) or organised by means of a workshop or seminar to which stakeholders are invited.

5.29 Of course, the selection of participants is a crucial factor in determining the representativeness of any scoping activity. Scoping exercises, involving a workshop or similar meeting, require careful preparatory work and planning covering:-

- background information to be provided to participants;
- organisation of sessions during the workshop/seminar;
- expected outputs; and
- provision of a workshop/seminar organiser.

Project Appraisal and EIA report Preparation

5.30 One option for initiating involvement during project appraisal is to prepare an early preliminary or interim report which describes the results obtained, to date, and whether any new issues have been identified. This report can be a focus for involvement and shows stakeholders, who may be unfamiliar with EIA, the type of work done and the nature of the output. This can be beneficial as it allows an additional opportunity for informing stakeholders of the aims of the EIA and to increase their understanding of EIA work. An enhanced appreciation of the contribution of EIA to social welfare improvement and environmental protection may lead to the identification of further issues which should be investigated in an EIA. If there is no opportunity for such involvement until much later, at the draft/final EIA report stage, then scope for meaningful involvement may be constrained, seriously, by lack of time and financial resources. It is better to incorporate involvement earlier rather than later in the period between scoping and the release of a draft/final EIA report.

5.31 At the stage when a draft/final EIA report is available there are two main issues to be discussed – first, whether the EIA has been undertaken in accordance with the ToR and whether it is technically acceptable, secondly, and perhaps more importantly,

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whether one of the alternative development options should be implemented. Usually, stakeholders are invited to present their views on both issues and the authorising agency reserves the right to consider such representations, but not necessarily to base a decision on them. Interestingly, the World Bank now requires participatory involvement at this stage if a project will involve involuntary resettlement and/or affects indigenous people (these are defined in World Bank policy statements and operational directives). In these circumstances the Bank and the in-country executing agency enable the affected individuals and groups to control decision-making on project approvals and implementation. It can be useful at this stage, whether or not involvement has been participatory, if a plan incorporating participation is devised for project implementation and evaluation activities.

Project Implementation

5.32 During construction and operation of a facility, the EIA recommendations on mitigation and monitoring should be implemented and, if necessary, developed further. Increasingly, consultative and participatory processes are established to 'manage' development-environment interactions, for example, by means of liaison committees. Again, participation is seen as increasingly essential to create favourable social conditions to help ensure the eventual success of a project. In the case of the Dahanu power station near Mumbai (Bombay), India, local people and NGOs had little faith in the ability of the State Pollution Control Board to monitor the effects of air pollution on crops. One possible strategy, which was the focus for discussions, would have enabled local NGOs to monitor the emissions.

Project Evaluation

5.33 A related, but distinct, exercise is to evaluate the extent to which a project achieves its objectives (economic, social and environmental). It is useful to incorporate the views of stakeholders in such evaluations; obtaining multiple perspectives on 'success' can identify social/organisational sectors which may feel that a project has either not been a success or is, in fact, harming their interests. Such views may, if not addressed, lead to increasing local disaffection or even alienation from the project, thus helping to ensure that it 'fails' If participatory involvement is undertaken, on a regular basis, such feelings can be identified and remedial actions formulated and implemented.

5.34 In some specific cases, involvement may be restricted by the need for confidentiality. Certain information may need to be kept apart from involvement processes because its wider availability may threaten national interests (for example, defence projects) or commercial advantages in the case of private sector operations in a competitive situation. Any restrictions on involvement will relate to specific data on raw material inputs, processes and outputs and not to the range of stakeholders involved or the extent, type and nature of their involvement. International EIA practice is based on the need for confidentiality to be demonstrated to the appropriate government agency before restrictions on information disclosure can be applied. Generally, very few EIAs raise issues of confidentiality.

FUTURE TRENDS

5.35 To summarize, stakeholder involvement is in accordance with global trends in democratization and increasing accountability. It also has positive effects on eventual project success through encouraging social commitment and ownership as well as leading to better project identification, preparation and implementation.

5.36 An increase in participatory involvement processes may lead to increasing conflicts between the different stakeholders (including the proponent and government). This has been an issue in certain developed, high-consumption countries. Purely consultative processes cause conflict, but decision-makers have more opportunities to ignore it. In many cases the conflict is channelled into existing political debate. If it is not accommodated in such processes then direct action can be taken by aggrieved parties (non-co-operation with authorities, obstructive tactics etc). Conflict has led to the development of environmental mediation as a means of increasing consensus on contentious issues. Mediation involves:

- joint fact-finding;
- informed dialogue; and
- joint and creative problem-solving.

5.37 Mediation is a voluntary, collaborative process in which mutually acceptable solutions are derived through face-to-face dialogue and negotiation between representatives of the key stakeholders who must be accountable to their constituents. The process is assisted by a mediator who must be acceptable to all parties and retain independence and impartiality throughout the entire mediation process. It is important that all parties have equal access to information and are able to withdraw at any time. No party is forced to accept an agreement. There is no guarantee that consensus will be attained, but experience has shown that mediation can be beneficial when the issues refer to value differences (not moral beliefs of right and wrong) and where the problematic areas are discrete, well defined and not open-ended.

COSTS

5.38 There is no doubt that stakeholder involvement takes time and resources and costs money. For projects in remote localities and multi-cultural contexts, the costs and other difficulties must be tackled and provisions made in EIA planning and budgeting. Costs which need to be considered may include:

- hiring of social scientists with local knowledge and experience of involvement processes;
- preparation of information sheets and report summaries in local languages;
- media publicity (newspapers, radios);
- travel costs to enable representatives of stakeholders to attend meetings; and
- EIA team time, travel, and accommodation costs to 'service" the involvement process.

However, as indicated at the beginning of this chapter the short- and longer-term local and national benefits are considered to outweigh the costs.

6. STRATEGIC ENVIRONMENTAL ASSESSMENT

INTRODUCTION

6.1 During the last 25 years, EIA has evolved into a comprehensive and versatile instrument for development planning and resource management. However, it has not played a significant role in reducing the serious global and regional environmental problems caused by economic growth. Scales and rates of environmental deterioration and resource depletion are more significant now than when EIA was introduced in the 1970s. It is also apparent that the EIA process, conventionally applied to projects, represents a limited response to these problems. There is a need to adopt more proactive, integrated approaches that deal with the multiple causes of this deterioration. The causes have been shown to lie in such initiatives as government macro-economic policies, energy and transport plans, and trade agreements.

6.2 It is realised, increasingly, that project-level EIA needs to be supplemented or amended so that the environmental consequences of all development-related actions can be incorporated in decision-making. In the past few years there has been great interest, on the part of governments and international agencies, in the potential role of strategic environmental assessment (SEA). SEA is seen as a promising approach by which the benefits of EIA can be greatly enhanced by applying the principles of EIA at a strategic level (in the form of SEA) to supplement the advantages being obtained, currently, from project-level EIA. The advantages of SEA are considered to outweigh, significantly, the cost of implementation. SEA is seen increasingly as the best available approach, especially if combined with decision-making based on sustainability criteria, to halt the continuing trend of global environmental decline. At present, SEA is still a relatively new concept, but experience and expertise are rapidly expanding. In this section attention will focus on the following issues:

- definition and scope;
- tiering;
- SEA and decision-making procedures;
- general approach; and
- SEA application to
  - privatization
  - structural and sectoral adjustment programs
  - trade agreements, and
  - laws and regulations.

DEFINITION AND SCOPE

6.3 The problems caused by project-by-project EIAs have resulted in the development of an approach which is termed cumulative EIA or, often, cumulative effects assessment. Basically, cumulative effects assessment is an attempt to deal with the implications of multiple development in the context of a project-by-project EIA system. It takes this EIA approach as its starting point, and incorporates a strategic, multi-development dimension.

6.4 Cumulative effects assessment is based on the knowledge that the impacts of individual developments can interact with each other to cause combined impacts which may be different in nature or extent from the individual impacts of each development. In some instances, the combined impact may be greater than would be expected from simply 'adding' the individual impacts together. To deal with this issue, it is advocated that project EIAs be extended and expanded explicitly to include not only the impacts of the proposed project but also the impacts of other past, existing and expected projects which may interact with those of the proposed project to cause potentially significant cumulative impacts.

6.5 Project EIAs, which are undertaken according to existing standards of good practice, already will incorporate an analysis of the cumulative impacts of past and existing projects when the baseline situation is being described. The existing state of the environment, and how it may change, is a function of the cumulative effects of all such projects. These baseline descriptions will include, also, the impacts of projects which would be implemented between the initiation of an EIA, for a specific project, and the likely date at which the project would be implemented. For example, if the expansion of a town is subject to an EIA, and a traffic by-pass is to be constructed in advance, then its impacts on the baseline environment situation should be examined before considering the impacts of the town expansion.

6.6 To implement a cumulative effects assessment, it is necessary to add the consideration of the impacts of future projects which are expected to interact, cumulatively, with the proposed project being subjected to the EIA. Only those projects with a high likelihood of occurrence (perhaps already approved) need to be analyzed. For example, if an increase in noise levels from a future project will not interact with such changes resulting from a proposed project (subject to an EIA), then cumulative noise impacts will not occur and can be omitted from the EIA.

6.7 Cumulative effects assessment is an attempt to deal with the inherent limitations of project-related EIA systems. It is, however, a rather limited approach as it remains tied to individual projects to 'trigger' its use. It would be more cost-effective if EIA principles could be utilised prior to decisions on higher level initiatives such as policies, plans and sectoral investment strategies which give rise to individual projects. One of these principles should be the key component or essence of cumulative effects assessment, namely the assessment of the combined impact of individual development actions in a defined area and over a specified time period. In the absence of any system for SEA, then there is a role for cumulative effects assessment. If SEAs are undertaken, then they should be an important part of the technical approach, not a 'stand alone' procedure.

6.8 There is no internationally agreed definition of SEA or guidance on how it should be conducted, but there is a consensus on the need for SEA. Here, SEA is considered to be a process for identifying and assessing environmental consequences in the context of the formulation and implementation of new or revised policies, plans and programs (PPPs), or other non-project level initiatives that may not conform exactly with a formal definition of PPPs (terms which themselves have different meanings in different countries). For example, a specific area may be the preferred location for a number of specific projects to be implemented at different times. These proposals can be the outcome of differing and non-co-ordinated development processes. There may be no plan in operation for that area and the only way of obtaining a picture of how that area might change as a result of the combined impacts of these individual projects is to implement an EIA which examines the combined impacts of these projects. This type of EIA is not linked, formally, to a policy, programme or plan.

6.9 SEA can be applied both at the level of broad policy initiatives and to more concrete programs and plans that refer to specific developments and locations. For example, rolling national or regional development plans are prepared regularly in many countries. Similarly, town plans or sectoral investment strategies are a common component of the development process.

6.10 There are other non-project-level actions which are not part of a formal policy or plan-making process, but which can have significant environmental consequences. These actions can occur unexpectedly and intermittently, thus making anticipatory action difficult to implement. Among such actions are:

- structural and sectoral adjustment programs;
- trade agreements; and
- fundamental political changes and accompanying policy initiatives (for example, the move from centrally-planned toward market-oriented economies and accompanying privatization).

TIERING

6.11 The relationship between SEA and project EIAs can be considered as occurring within a tiered system. The nature and role of tiering can be examined in the context of the energy sector. There is a series of linked decisions which are made leading, ultimately, to project approvals. Fundamental, early decisions are made at the policy level. These decisions set the context for 'downstream' decisions which have more limited focus. Basically, these decisions form a hierarchy. An early policy decision might deal with strategic issues on energy generation. An EIA of alternative power-generating options, prior to such decisions, would assist identification of the environmental costs and benefits and, hence, the selection of a preferred option. This option might involve a mix of thermal, hydro- and wind sources of power. Individual hydro-schemes, or coal-fired power stations, would then be subject to site-specific EIAs. These EIAs would be implemented within the context of the earlier energy sector policy EIA. The basic design/location configurations for these projects may have been formulated previously on the basis of environmental considerations, so the extent of the project-level EIA should be less detailed and time-consuming than would have been the case if the initial policy-level EIA had not been done. Secondly, a considerable amount of data will have been gathered and consultations undertaken. Results from this previous work will be available to the project EIAs, thus helping to reduce the cost and length of these EIAs. In this context, these project-level EIAs can be considered to be nested within the policy level EIA.

6.12 In a tiered or hierarchical EIA approach, the type and nature of the environmental information provided through the application of EIA depends on needs of the decision-makers at specific stages. For higher level policy or planning decisions the environmental information will not be precise and quantitative and probably will relate to general, broadly defined, issues rather than specific **impacts**. Later, when EIA is applied at the project level (for projects which are a direct outcome of a policy or plan), detailed impact-specific, technical information is needed.

SEA AND DECISION-MAKING PROCEDURES

6.13 There are two basic mechanisms for introducing SEA into national decision-making procedures. In some countries SEA is introduced by applying existing EIA procedures to higher-level decisions. A variation, occurring in those countries with no EIA systems, is to introduce an EIA system which covers all types of proposed development actions. Alternatively, some countries with project-oriented EIA systems have established formal or informal 'stand-alone' procedures which operate separately from the project-level EIA procedures. There is insufficient evidence to indicate which of these approaches is the more effective.

6.14 Three basic approaches to determining when SEA should be used have been developed. SEAs can be utilised when:

- an initiative is expected to cause significant adverse environmental impacts (this is similar to many EIA systems);
- an initiative is likely to affect the number, location, type and characteristics of projects which would be subject to EIA (for example, thermal power stations and highways); and
- an initiative affects a sector (such as transport) which has been identified as a priority in environmental terms.

6.15 Provision can be made in formal EIA procedures, however, for possible extension of EIA to other contexts. It might be possible, for example, for many developing countries and economies in transition to require that EIA (in essence, SEA) be applied to structural/sectoral adjustment programs since there may be a strong probability that such programs may be implemented in the near future. This could be done by ensuring that the definition of actions to which EIA must be applied is broad enough to capture any adjustment programme when, or if it is likely to be, implemented. Trade agreements are another matter. They are often the outcome of multi-lateral negotiations, and even when they are bi-lateral the relationship may be one of unequal partners. These factors make it extremely difficult for a government to ensure that all parties 'sign up' to the need for a SEA of alternative options for the final set of agreed trade provisions.

GENERAL APPROACH

6.16 The general principles of EIA can be applied to SEA, whether at the broad policy level or at the programme/plan level. These include identifying and assessing the severity of potential or actual environmental (and social and economic) consequences of alternative policies and actions, recommending mitigation measures and influencing the design of policies and actions.

6.17 Often, the policy-making process does not correspond to a rational, step-by-step process moving from broad strategies, via plans and programs, to concrete projects. Development polices are moulded implicitly by earlier choices and actions, rather than vice versa; and short-term political imperatives often direct and control decision-making. At the level of programs and plans, which usually follow from policies, initiatives and actions are more concrete and often refer to specific projects and localities. The application of SEA, therefore, will require a discriminating approach that differentiates between:

- SEA of **existing** policies, programs or plans which give expression to long-standing commitments – for example, to agricultural improvements that lead to cumulative wetland loss; and
- SEA of major **proposed** initiatives that set new policies, directions and precedents that may cause potentially significant impacts.

6.18 Some commentators argue that SEA should cover both of the above categories. Others feel that SEA should be restricted to the second category. The latter option requires a more proactive approach which should be applied, ideally, to assist PPP formulation, but may be undertaken, at minimum, as a final check on their environmental impacts once they have been finalised. Although still useful, this latter approach is a very restricted application of SEA which does not realise its full potential. In proactive SEA, it will be possible to identify and predict potential impacts (for example, from envisaged construction projects and activities). In some cases, standard EIA methods may be applied to identify and predict impacts and define alternatives – though, typically, there will be a greater reliance on qualitative information compared to project-level EIA. In other cases, it will not be possible to easily identify and describe precise impacts, but established policy analysis tools may be used to identify environmental implications and issues from alternative scenarios and options.

6.19 Experience to date has shown that it is easier to apply SEA to those programs, plans or similar initiatives that have a direct relationship to projects. It is not particularly difficult to apply a revised version of the approach and methods derived from project-led EIAs to such actions. Additionally, it is straightforward to identify alternatives and to implement stakeholder involvement in the 'classic' EIA manner. Box 7 shows the work done and main results obtained for an EIA of a forestry management plan in Nepal. When SEA is applied to policies or actions which do not relate directly to projects, there is more difficulty in identifying impacts and predicting the likelihood or probability of various outcomes (scale, location and magnitude of the impacts). Indeed, there may be unknown outcomes.

Box 7: EIA of the Bara Forest Management Plan, Nepal (based on IUCN Nepal 1995)

The Plan aims to harvest mature Sal (Shorea robusta) trees for commercial purposes in 26,000 ha of the Forest of Bara District, Nepal, and to protect natural regeneration of Sal saplings, producing even-aged Sal forest.

There are three reasons to support this initiative of shifting the emphasis from Protection Oriented Forest Management to Production Oriented Forest Management particularly for Sal forests of Nepalis Terai area:-

- the Sal forests in Nepal are rapidly disappearing while the demand for forest products continues to increase and in the long-term the forest resources will be exhausted. When forest products become scarce, the prices of timber, wood and fodder will increase. However, adopting a Production Oriented Forest Management System would produce more wood products and thus exert a downward pressure on the market prices;
- the current practices of allowing harvesting of only the mature trees and the collection of dead and decayed trees have both contributed to forest degradation; and
- the large canopy of Sal trees prevents the penetration of light to the forest floor. The removal of crown cover by harvesting the matured trees will open up the area, so that the growing Sal saplings get sufficient light to grow. This has been proved in trial plots.

EIA

The Bara Forest Management Plan includes activities which will involve changes in management regime, thus causing an array of adverse and beneficial impacts associated with the biophysical, social, and economic aspects of the area.

The EIA considered the major environmental impacts likely to arise from implementing the Plan by considering two alternative options: (1) do-nothing alternative – likely impacts of the existing situation continue; and (2) implementation of proposed Plan – a change from a passive regime to an actively managed production forest.

Over one hundred and fifty possible impacts of varying significance were determined. These impacts were synthesised into nineteen main issues of concern. Each issue was then analyzed by a team of professionals and best professional judgement was used to determine the magnitude, extent, and duration of each positive and negative impact associated with the alternatives. A numerical ranking system was utilised, following the format given in the National EIA Guidelines (1993) and EIA Guidelines for the Forestry Sector (1993).

The results of the issue analysis form the basis for recommendations indicating how the plan could be improved, thus increasing its potential for successful implementation.

Conclusions

The Plan has considerable merit and should be implemented subject to incorporation of recommended changes. Many of the negative impacts now seen in the District could be reduced or even eliminated by the careful implementation of the Plan.

Some of the impacts identified for the Plan require high-level government decisions – such as issues of tenure and the legislative and administrative authority by which major issues will be resolved.

A number of components were suggested as additions to the Plan – for example, the following important goals and objectives:

- to prepare a comprehensive forest management plan that incorporates information on all aspects of forest usage in a manner that will permit the development of an efficient and effective production forestry regime in the Bara Forest District;
- to develop the necessary baseline data so that production and conservation objectives can be properly implemented in a sustainable manner;
- to recommend the necessary policy, legislative authority and institutional framework that will be needed to facilitate effective implementation of the forest management plan;
- to work with the people affected by this plan, and other interested parties, to ensure that the plans and actions are technically defensible, and conform to the principles of the World Conservation Strategy, The National Conservation Strategy of Nepal, and the Convention on Biological Diversity (1992); and
- to develop and implement sound silvicultural and harvesting regimes that will permit the effective utilisation of the indigenous tree species in a sustainable, environmentally and socially acceptable manner.

In addition, a variety of suggested improvements to the Plan and Plan activities were formulated and costed – for example, it was recommended that an effective monitoring and evaluation strategy was essential. This will require a carefully designed set of research initiatives to determine current baseline conditions and to track the changes, both good and bad, that result from its implementation.

6.20 The uncertainty factor makes it essential that outcomes are explored in qualitative terms (issues rather than impacts) and that expert judgement incorporating various criteria, such as the precautionary principle, is applied. It is necessary, of course, that this judgement is reached on the basis of involvement with stakeholders (as in project-level EIA). The issue to be faced is the timing and extent of this involvement. To date, experience seems to indicate that there are issues of confidentiality and established bureaucratic practice which make the transfer of the type of stakeholder involvement which occurs in project-level EIA impractical and, indeed, unacceptable to many governments. One favoured option seems to be to involve representatives of the key stakeholders, particularly NGOs. Various meetings, in closed session (to protect confidentiality), are held to obtain their views and suggestions.

6.21 SEA differs, to some extent, from project-level EIA in the scope and nature of its role in shaping the development process and in decision-making. The difference is not fundamental – it is one of emphasis. Policy, programme and plan preparation and implementation is a continuous process which follows a spiral or cyclical track through time. Theoretically, there is no end point. Policies and similar initiatives are continually being revised, renewed and 're-invented' as experience is gained and new circumstances and social goals/objectives become determining priorities.

6.22 This continuous process means that SEA practice has to be flexible, adaptable and process-oriented. It cannot be cumbersome, with extensive time and resource inputs, otherwise it will be abandoned as being ineffective. SEA has to be even more 'process-oriented' and less 'product-oriented' than project-level EIA. Project-level EIAs are process-oriented but there is an end-point which is successful impact management of the interactions between a project and the environment until the project is abandoned or decommissioned. It is generally agreed that SEA should move away from a focus on impact management toward a focus on the implications of an action on national/ regional/local sustainability. This means that decisions will be based on the outcome of sustainability 'tests' based on the outputs of SEAs. SEA is, therefore, a means of assisting governments achieve sustainability through a type of sustainability assurance.

6.23 A simple framework for assessing programs and plans which will result in physical development projects has been developed by UNDP (1992). UNDP has a key role in initiating, co-ordinating and funding technical assistance and appraisals before any investment occurs. It is represented in most countries and is active in programming and co-ordinating their requests for development assistance. Much of its work is executed by other organizations such as the multi-lateral banks. UNDP, therefore, has an important function in establishing the framework and context within which projects and programs are developed. It has an input into initial design of a project or programme.

6.24 UNDP has devised an environmental management framework to help ensure that environmental issues are given proper consideration before decisions are made. UNDP is active earlier in the project or programme life-cycle than almost any other agency, and it needs to be sure that the environment is a major factor in its work so that later actions and initiatives are designed with an environmental dimension already incorporated (the nature and extent of the environmental input will vary). UNDP's work complements the activities of the multi- and bi-laterals whose EIA procedures tend to be implemented once a project or programme has been identified. There is an opportunity for governments to achieve optimal benefit from financing institutions by assisting and encouraging closer in-country integration of the results of UNDP work with those of agencies which fund projects.

6.25 One of its major in-house tools is the Environment Overview (EO), which is a structured approach to assessing the impacts of a proposed programme (or project) and for incorporating, if needed, an environmental dimension into the proposed activity. In many respects the tasks to be done parallel the work needed in an SEA. Box 8 provides a list of the key steps in the EO process, with brief descriptions of the work to be done and information to be presented. UNDP has been using this approach widely since 1992, and considerable experience has been gained in its use.

6.26 EOs have the following objectives:

- identify main environmental opportunities and constraints;
- identify the most significant environmental impacts;
- identify areas of uncertainty and social and economic conflicts that may arise from environmental changes;
- incorporate environmental objectives into a programme (if not already incorporated); and
- suggest alternatives and implementation measures for the selected option.

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6.27 EOs are intended to be done speedily and effectively and to be easy to use. These criteria mean that they must focus on a few very important and secondary data sources. UNDP recommends that participatory techniques are used to assist preparation of EOs and that primary data collection is only done when absolutely essential. There are strict guidelines on size of EOs (as shown in Box 8), with the total length not to exceed seven pages.

Box 8 : Preparation of Environment Overviews

1. **Brief Description of the Environment of the Area of the Action** (1 page maximum)
In general, this section is intended to provide all those who are participating in the development of an action with basic general information on the physical characteristics of the environment in the area. The idea is to highlight any important aspect of the natural environment that might be a determinant in the design, appraisal, extension, approval and assessment of a proposed action.

2. **Main Environmental Issues** (1 page maximum)
This section covers the three environmental issues that are most important in the area where the action will be implemented – for example, whether the area is prone to flooding, whether there is an ongoing process of desertification, or the sustainable fish catch potential is smaller than present exploitation. Topics to consider might include quality of life of the local population, natural hazards, fragile ecosystems, role of children and women and over-crowding. Consultations with local population groups will improve the accuracy of this section.

3. **Economics and the Environment** (1 page maximum)
This section contains an assessment on how the prevailing economic situation will affect the environment. It will list any prevailing national or local economic policies and regulations that affect the quality of the environment. Any enforcement mechanisms to protect the local environment should also be included. General statements about the population's socio-economic situation may be added if not listed under 1 above.

4. **Environmental Management** (1 page maximum)
This section should describe the capacity of people and institutions working in the area to cope with their environmental problems, achieve appropriate environment management and promote sustainable development under these headings:
- Legal and regulatory;
- Major environmental factors; and
- Technical and managerial capacity to deal with environmental issues.

5. **Major Natural and Socio-Economic Impacts Associated with Implementation of the Action** (1 page maximum)
This section should incorporate the views of the affected population groups and include:
- Potential impacts on the natural environment; and
- Potential socio-economic impacts.

6. **Design Alternatives** (1/2 page maximum)
This section will discuss the possibility of altering the design (technology, objectives and methodology of implementation) to take better advantage of the opportunities offered by the environment in the area, and to mitigate and eliminate the environmental disadvantages that the action might create.

7. **Identification of Conflicts of Interest**
Some of the objectives pursued by different environmental actors might conflict. For example, the interests of companies that make and sell chemical fertilisers will conflict with activities aiming to promote organic farming. Such conflicts of interest must be identified and possible alternatives devised to avoid them. An incentive might be proposed for the chemical enterprise to sell other fertilisers (including organic) that will promote soil fertility without damaging the environment.

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8. Formulation of an Operational Strategy

The most important action-oriented part of the Environmental Overview is the formulation of an operational strategy that will allow the achievement of the environmental objectives and goals proposed for the action. The strategy must be formulated by the staff proposing, designing or evaluating the action in a participatory manner. The following must be identified:

- Specific environmental targets to be achieved;
- Participants in environmental management;
- Plan of activities and timetable;
- Environmental information needed;
- Support structures and activities;
- Implementation responsibilities; and
- Decision-making.

9. Monitoring

Implementation of the action and main expected impacts should be monitored.

6.28 More sophisticated approaches focusing on actions which may not involve physical development projects (for example, fiscal policies) are available, generally based on experience in developed countries. Boxes 9 and 10 show the approach and type of information that could be generated and, if necessary, included in a comprehensive SEA report for such actions. The 'model' shown need not be applied rigidly; instead it should be considered as a framework which can be adapted and used flexibly to meet specific SEA needs.

SEA APPLICATION

6.29 Below, the application of SEA to the following specific types of development initiatives is discussed:

- privatization;
- structural and sectoral adjustment programs;
- trade agreements; and
- laws and regulations.

Box 9 : Basic Steps in SEA (based on Sadler and Verheem, 1994).

1. **List the objectives of the policy, plan or programme, including the formal decisions that need to be taken, and identify the constraints**

   give the objectives and priorities; identify any conflicts and trade-offs between them; indicate how binding the constraints are and whether they might be expected to change over time or are negotiable.

2. **Scope and analyse existing environmental issues and problems and protection objectives**

   focus on the main issues and problems that could be affected by the policy, plan or programme, either negatively or positively; use relevant environmental policies to list relevant environmental protection objectives for these issues/problems.

3. **Specify feasible options for planning decisions and identify their environmental consequences**

   identify and evaluate environmental issues and impacts, including cumulative impact and sustainability issues; do not disregard likely effects simply because they are not easily quantifiable.

4. **Undertake consultations**

   identify key stakeholders and obtain their views on the SEA results before decisions on implementation are made.

5. **Identify measures to mitigate or compensate significant environmental impacts and suggest a preferred option**

   concentrate the analysis on those impacts which are material to the decision; compare them with relevant environmental protection objectives; compare alternative options; include a 'with-and-without-proposal' comparison; test the sensitivity of the outcome of the analysis to possible changes in conditions or to the use of different assumptions.

6. **Set up any monitoring necessary and decide at which stage to evaluate the implementation of the action**

   wherever possible, identify further requirements for assessment; specifically list any projects, activities, etc that may require EIA at the project level.

Box 10 : General SEA Information Requirements (based on Sadler and Verheem, 1994)

A good quality SEA will use and produce information on:

1. **The planning process**

- the policy, plan or programme to be approved, including an overview of relevant past developments;
- its main objectives;
- an indication of how it will influence concrete projects;
- the way environmental policy goals and standards have been taken into account in its development; and
- main mitigation measures and alternative options that have been investigated in formulating the policy, plan or programme.

2. **Baseline context of the planning process**

- existing environmental quality of, and problems in, the areas affected; and
- objectives for environmental protection and related measures.

3. **Environmental consequences of policy options**

- identification and description of environmental consequences of options; and
- comparison of options in the light of
  - sustainability
  - existing environmental quality of the area affected, including environmental problems relevant to the planning process, and
  - objectives of environmental protection.

4. **Arrangements for monitoring and post-approval analysis of the implementation of the policy, plan or programme**

- relationship to further decision making;
- feedback of monitoring data to further stages of policy etc making; and
- requirements for EIA in later stages.

5. **Difficulties and uncertainties**

- overview of the difficulties (technical deficiencies or lack of knowledge) encountered in compiling the required information; and
- discussion of the resulting uncertainty in the provided information and what this uncertainty means for the planning process.

6. **Recommendations for decision making (when appropriate)**

- approval/refusal of proposal(s); and
- terms and conditions for implementation.

7. **Summary of the provided information**

Privatization

6.30 Globally, there has been a continuing and intensifying trend toward moving enterprises concerned with such activities as industrial operation, mining, hydrocarbon exploitation and provision of water and sanitation services from the public to private sector. This policy change, which is being undertaken for political and economic reasons, has environmental implications globally, nationally and at the level of individual sites. Privatization is a good example of a policy which leads, directly, to project-level changes and initiatives.

6.31 In addition, particularly in the European economies in transition, land is being privatised. In most of these nations land was removed from private owners and farms amalgamated into larger units owned and managed by the state. This change caused massive social upheaval and related environmental impacts. Now these large units are being broken up and returned to private ownership. The rates at which this process is occurring vary from country to country as do the mechanisms by which the changes are being put into effect. There is no doubt, however, that there are potentially significant biophysical, social and economic impacts associated with this process.

6.32 Most international experience in the application of EIA to privatization has focused on the industrial and energy sectors. Virtually no work has been done on policies or programs of land privatization or on specific projects to privatise particular areas or large collective farms. Thus, attention below will be paid to an analysis of the use of EIA in industrial and energy privatization.

The main environmental issues associated with privatization concern existing and expected biophysical and health impacts. There are three main types of impacts arising from privatization:

- incremental impacts;
- the regulatory 'freeze' effect; and
- recapitalization impacts.

6.34 Incremental impacts occur when, in the absence of a strong regulatory framework, the new investor wishes to maximise profit by increasing throughput and, all other aspects being equal, discharging more pollution and depleting natural resources at a faster rate. The regulatory freeze effect occurs when, during or after the privatization process, new owners or investors resist the imposition of new or strengthened regulatory controls which were not expected at the time of the ownership change. Successful resistance means that cumulative environmental degradation not only continues to occur, but also that environmental improvements are delayed or even do not occur. Finally, recapitalization effects occur when polluting enterprises, which would have stopped trading due to financial difficulties, are revived by the new owners and continue to pollute or increase the amounts of polluting discharges.

6.35 Not all effects of privatization are harmful. There can be substantial benefits through increased efficiency in manufacturing processes, recovery of materials from waste streams and recycling. These activities can all reduce discharges and the need for new facilities, particularly in the energy sector. Also, new investment can lead to the speedy introduction of newer and cleaner technologies reducing the amounts of pollutants discharged.

6.36 Privatization usually involves a new ownership and management regime with different objectives, opportunities and constraints. Privatization and its effects cannot be separated from the wider and fundamental changes occurring in the socio-economic, institutional and regulatory context within which projects are identified, prepared, approved and managed. These changes occur in all countries undergoing privatization, but are most profound in the economies in transition of central/eastern Europe. Privatization does not involve new installations or facilities, although a change of management might be accompanied by the introduction of new technology or operational practices. A change of management, with a revised set of imperatives, operating in an altered regulatory framework can result in environmental consequences which should be assessed to determine measures that need to be taken to prevent or reduce significant adverse effects. This situation conforms closely to the 'classic' situation for application of EIA. However, there is an important issue which relates to the past and current impacts of existing facilities which will be privatised. This is the issue of liability. New owners are reluctant to be held liable for previous damage (whose full extent may not be known) or future adverse consequences which are not easy to predict at present. This factor means that potential investors wish to know the extent of existing environmental damage and whether there may be any 'surprises' waiting to occur. The analysis of existing and possible future longer-term consequences of existing pollution loads is termed, generally, an environmental audit. In the context of privatization, environmental audits and EIAs have a very close relationship.

6.37 The policy of privatization defines, sharply, the objectives of EIA. The economic situation of the countries undergoing privatization ensures that economic imperatives are very significant, if not dominant, in the development process. Basically, this means that the management of impacts has to be the focus of environmental studies. The impacts to be managed are both the current and the expected impacts arising from a specific sector or installation. In the privatization context there are three options:

- an environmental audit of an existing facility or sector;
- an EIA of future likely impacts; or
- an EIA/audit combined.

6.38 Practice varies from country to country and between financing agencies. In one case, audits and EIAs are considered to be separate studies and audits more often used than EIAs. The World Bank recently in one of its updates to the *Environmental Assessment Sourcebook* considers an audit to be very close to an EIA. Even when only an audit is implemented, the results must be treated as if they were obtained from an EIA. The reports are publicly available and consultations are essential. There is an exclusion principle which allows commercially sensitive information to be kept confidential, but otherwise all pertinent environmental information should be disclosed. Box 11 describes, briefly, the scope of World Bank work on a privatization policy in Jamaica and Box 12 shows the possible structure of a sectoral EA for privatization.

Box 11: Jamaica: Private Sector Development Adjustment Loan And Environmental Auditing

Jamaica has embarked on an ambitious privatization programme covering several industrial and other sectors, with World Bank technical and financial support. At an early stage, environmental staff in the Latin America and Caribbean (LAC) Region screened a total of 67 Jamaican public enterprises (PEs) considered for privatization and categorised them according to the anticipated environmental requirements. A mission was conducted to: (1) review environmental information and performance of selected PEs considered for privatization; (2) identify and visit the selected PEs to determine if an environmental audit would be needed prior to privatization; and (3) visit the Natural Resource Conservation Authority to discuss institutional and regulatory issues related to the environmental aspects of the privatization process.

The mission established that environmental audits were warranted for 21 facilities, including petrochemical, steel and railway operations, while environmental site assessments would be needed for 2 closed facilities. In one case, a dairy operation, the mission recommended an EIA rather than an audit, since the enterprise would be converted to other uses following privatization. In another case – privatization and expansion of an airport terminal – both environmental audit and EIA were recommended.

Box 12 : Applying A Sectoral EIA To Privatization

Components of Sectoral EIA	Possible Privatization Inputs
Policy, legal and institutional framework	Description of current privatization policy, environmental liability rules, relevant environmental standards, enforcement capacity, and stability of existing regulatory regime.
Description of sectoral investment programme	Description of privatization plan and the sector as a whole: enterprises, prospective investors (foreign/domestic), the planned use of environmental audits and other types of environmental analysis.
Description of baseline inter/intra-sectoral environmental issues	Baseline information on stocks and flows of pollution in the sector or among the privatization candidates, current impacts on environment and health information gaps, results of previous relevant environmental studies.
Prediction of impacts	Impacts of planned privatization programme, taking into account the regulatory regime and possible changes in this regime, market-based private sector behaviour, and developments in other sectors of the economy.
Analysis of alternatives	Environmental costs and benefits of alternatives, including continued state ownership, liquidation, greenfield investments, privatization of other industries, etc.
Mitigation plan	Design of strategy and plan for clean-up and other mitigation measures for the sectoral privatization process: may include standards for cleanup and other remedial measures, standards and regulations for ongoing pollution problems, or plan for developing and using in-country capacity for environmental auditing and clean-up actions.
Monitoring plan	Plan to monitor and enforce compliance with environmental regulations, including clean-up where relevant.
Environmental management and training	Plan to strengthen government and private capacity in environmental management through training, upgrading of monitoring technology, etc.

6.39 There appears to be a trend towards using both audits and EIAs in one combined study. Such a study can deal with liability issues and provide a picture of how the environment will be affected in the future, not only from past impacts, but also from the cumulative effects of new discharges on existing contaminated areas. In analysing past and current impacts, the audit can provide baseline information for the EIA component of the study. Also, by identifying clean-up mitigation and monitoring measures to deal with current environmental problems, useful pointers are provided to assist those implementing EIAs who will be concerned with recommending

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monitoring and investigation programs to deal with future impacts. By combining audits and EIAs, greater management capabilities are created to handle the interactions between a facility, a group of installations (for example, a port complex) or a sector and the environment. Although audits and EIAs are answering different questions, the combined answers can provide a sounder basis for decision-making than the answers from only one of these studies.

Structural and Sectoral Adjustment Programs

6.40 In the past ten years, there has been a clear, global ideological movement in terms of the role of government in economic issues. There has been a shift away from state intervention and central economic planning toward greater liberalisation, privatization and reduced governmental control. This trend has been most marked perhaps in the central/eastern European economies in transition. However, this trend has been prominent, although less politically dramatic, in many developing countries. In these countries international lending institutions such as the World Bank and the International Monetary Fund have been prominent in introducing and assisting this process. The main policy instruments used have been economy-wide structural and sector adjustment programs. Usually, these programs try to achieve macro-economic goals by reducing government budget deficits, promoting market liberalization, privatization, altering rates of exchange (usually via devaluation), strengthening government and market institutions and pricing reforms in key sectors.

6.41 These actions individually and collectively can affect the environment directly and indirectly. It is essential that governments should understand the linkages between these activities and their environmental consequences (there is a considerable number of case studies available - especially from the World Bank). This can be done by use of EIA in which the implications of a structural adjustment programme can be investigated through impact identification, prediction and evaluation, formulation of mitigating/monitoring measures and subsequent follow-up. Experience has shown that the type and direction of environmental change can be relatively easy to identify, but its extent can be more difficult to ascertain. There is, generally, a small number of identifiable linkages affecting important environmental concerns. Therefore, in EIAs for structural/sectoral adjustment programs it will be relatively simple to structure the analysis to a consideration of key issues, through examination of past experience from other countries and carefully conducted scoping activities.

6.42 A basic structure for an environmental analysis of economy-wide adjustment programs has been advocated by Munasinghe and Cruz (1994) of the World Bank. It involves:

- problem identification
    - identify environmental features and trends and those which may be affected by the programs;
- analysis
    - assess and evaluate likely impacts using a formal approach – for example, a matrix (see Figure 1);
- remedies
    - mitigation/monitoring measures, and
    - contingency plans for impacts characterised by great uncertainty, but which could be very damaging if they occurred;
- follow-up
    - monitoring implementation for key impacts/environmental components, and
    - review of results and initiation of corrective actions if required.

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6.43 Although some of the terminology differs, these tasks, and their sequence, are very similar to standard EIA activities. Again, it is clear that such EIAs need to be linked to sustainability analyses and natural resource accounting. The outcome, ideally, is the integration of environmental strategies into economy-wide adjustment policies in order to achieve the maximum number of 'win-win' outcomes.

6.44 Figure 1 shows the structure of a simple and incomplete example of an Action Impact Matrix. It shows how this method might be used to structure an EIA. The first column lists examples of the main development actions (policies and projects). The first row contains a list of key sustainable development issues. The cells contain information on expected interactions between the column and row components. More refined matrices may be produced if certain impacts need to be analyzed in detail. Figure 2 shows a section of a completed action impact matrix for Sri Lanka.

6.45 Using SEA to investigate and design policies and programs, such as those relating to privatization and macro-economic structural or sectoral adjustment, will identify adverse impacts. For example, privatization may lead to additional pollutant loadings to the atmosphere. In another context, the extension of private investment and ownership of natural resources, such as water, may reduce the access of poor people to the resource, causing considerable hardship. Removal of a price subsidy can have a similar effect.

6.46 Such impacts may be avoided or reduced in severity by introduction of various economic instruments. For example, in the case of additional pollution loading to the atmosphere, the following measures could be implemented singly or in various combinations:

- charges on emissions;
- soft loans for purchase of pollution control technology; and
- tax incentives to reward pollution discharge reductions.

6.47 In the case of reduced access by poor people to water it may be appropriate to introduce a subsidy, probably on a temporary basis until a more satisfactory solution is found (for example, a new borehole). It is important, however, to assess the likely overall effects of using such instruments at the local, regional and national level in terms of:

- achieving the intended objectives; and
- unintended, adverse environmental impacts.

Only when such analysis shows that the objectives will be achieved without significant adverse environmental consequences should such economic instruments and measures be implemented.

TRADE AGREEMENTS

6.48 The relationships between trade agreements and environmental change are complex. It is not appropriate here to investigate this issue; instead the potential role of EIA in bi-lateral and multi-lateral trade negotiations is considered. No country has EIA legislation which requires EIA reports to be prepared during trade negotiations or once an agreement has been reached (although there was considerable legal argument as to whether US EIA provisions applied to the North American Free Trade Agreement – the eventual result was that no EIA was done under the law). The former option is preferable as it allows for enhanced and early internalisation of environmental costs and should lead to more sustainable trading arrangements. Until now, EIA-type studies of trade have been undertaken on a voluntary basis (this occurred in the

USA/Canada with regard to the North American Free Trade Agreement), but using principles, approaches and experience gained from project EIA and SEA.

Figure 1 Simple Example of an Action Impact matrix

ACTIVITY/ POLICY	MAIN OBJECTIVE	IMPACTS ON KEY SUSTAINABLE DEVELOPMENT ISSUES			
		Land Degradation	*Air Pollution*	*Resettlement*	*Others*
1. Macroeconomic & Sectoral Policies	**Macroeconomic and Sectoral Improvements**	Positive Impacts Due to Distortions Negative Impacts Mainly Due to Pre-existing Constraints			
• *Exchange Rate*	• Improve Trade Balance and Economic Growth	(-H) (deforest open-access areas)			
• *Energy Pricing*	• Improve Economic and Energy Use Efficiency		(+M) (energy efficiency)		
• *Others*					
2. Complementary Measures [2]	Specific/Local Social and Environmental Gains	Enhance Positive Impacts and Mitigate Negative Impacts (above) of Broader Macroeconomic and Sectoral Policies			
• *Market Based*	• Reverse Negative Impacts of Market Failures and Policy Distortions		(+M) (pollution tax)		
• *Non-Market Based*		(+H) (property rights)	(+M) (public sector accountability)		

6.49 At a minimum, EIA could be applied to trade agreements and policies to identify areas and communities likely to be affected (Box 13). Identifying and evaluating the spatial and temporal distribution of impacts would allow monitoring activities to be implemented to determine if the impacts were occurring. If they were found likely to be severe, early action could be taken to ameliorate them. Such a role for EIA is useful, but not nearly so beneficial as using it **during** the negotiations (in a manner similar to the use of SEA in plan and programme formulation).

6.50 Basically, trade agreements cause changes in economic activities at national and international levels. For example, the results of the Uruguay Round are expected to increase global GDP by $213-247 US billion by 2005. Most of this increase is expected from the agricultural sector only. The remainder is expected to come from manufactured goods, especially textiles. Within the agricultural sector it is expected that the prices (and hence production) of dairy foods, sugar and wheat will increase. This type of analysis indicates to national governments the sectors and sub-sectors of their economies which may be affected. In EIA terms, it is possible then to analyse the current environmental aspects of operations in these sectors (baseline) and then predict the changes which might occur from enhanced production. In this analysis attention needs to be given to the difficult question of existing market distortions. For example, subsidies for pesticide or water use may be causing over-use and subsequent environmental damage, and the trade agreement may make this situation worse. Usually, the situation can be improved by tackling the problem of market distortion rather than via trade. It is important, however, that the implications of removing or altering subsidies are assessed for their environmental (and social/health) consequences .

Figure 2 Sri Lanka Action-Impact Matrix

Economy wide Policy Reform Goals/Instruments	Urban and Industrial Pollution	Forest and Biodiversity Protection	Agricultural Land Conversion and Degradation	Energy Generation and Conservation	Water Resources Depletion and Degradation	Coastal Resource Degradation
Sectoral/Inter-sectoral Price and Institutional Reforms i) Resource Access Rights & Tenure	[+] property rights allowing community-based management of coastal areas and coral reefs could strengthen incentives to reduce industrial and agricultural pollution	[+] decentralization and social forestry-type institutional support will reduce open-access exploitation of forest and wildlife resources	[+] tenurial security will promote investment and improve land management (note: in some cases, privatization may be externally imposed on communally managed lands, leading to a break-down of traditional management systems)			[+] introduction of community rights over fishing & mangrove resources would encourage better resource management
ii)Price and Subsidy Reforms			[+] removal of subsidies will encourage more efficient/reduced use of agricultural chemicals	[+] improving energy prices will promote more efficient energy generation and use [-] higher prices may reduce access to the poor	[+] introducing higher industrial and irrigation water fees will encourage efficiency in water supply and use [-] higher prices may reduce access to the poor	
Privatization i) Improve Efficiency in Use of Resources (eg., with financial reforms and hard budget constraints)	[+] reduce waste in resource-based manufacturing		[+]increase efficiency of tea plantations, leading to better land management (note: in communally managed lands, privatization may be associated with negative effects, as discussed under institutional reforms above)	[+] increase efficiency of generating plants, with pricing reforms (see below), it will also increase energy efficiency among industrial users	[+] promote more efficient provision of urban and industrial water supply	
ii)Promote Private Investment	[+] private investments tend to introduce less polluting technology	[+] alienating land for plantations or allowing sufficiently long-term leases could promote plantation development	[+] may increase investment in land improvement	[+] new plants tend to be more energy efficient	[-] together with price increases, this may reduce access to water by the poor	

Box 13 : Environmental Impacts of Trade Policies on Hainan Island, Peoples' Republic of China

Hainan Island is the largest Special Economic Zone in China. These Zones were designated to attract foreign investment and to accelerate the economic growth of China. Tax and other financial concessions were the main mechanisms used and the results, in terms of economic growth, have been spectacular. Unfortunately, there have been adverse impacts:

- over-exploitation of water resources;
- pollution from inadequate treatment and disposal of wastes;
- degradation of coastal ecosystems and loss of renewable resources; and
- contamination of groundwater and soils with toxic materials.

Impacts depend on the existing economic structure and environmental conditions. For example, Hainan has a number of industries which have been sited for purposes of regional development. These are not viable in the 'new' trade arrangements. It is likely that many will cease operating and pollution will decrease. However, the government will be faced with increase unemployment in these areas and the need to pay additional pensions to workers who retire early. This expenditure may reduce the money available to the government to implement environmental protection measures in the context of the trade liberalisation.

From: Environmental Resources Management (1992).

6.51 The use of EIA in a trade context need not mean massive, expensive studies. As shown in the context of SEA, it is possible to undertake relatively simple and quick studies which can identify major problems and their magnitude. This information can form a basis for action. There are two aspects of using EIA in trade negotiations. First, it is important that such EIAs be linked to a national resource or environmental accounting system. Without this linkage the potential benefits of using EIA will be minimised. Secondly, if EIA is undertaken on a bi-lateral or multi-lateral basis (instead of one country considering the impacts within its boundaries), then trans-boundary issues will be an important aspect.

Laws and Regulations

6.52 In a few countries, the formal EIA (or SEA) procedures apply to proposed laws or regulations. The utility of applying SEA to these actions is self-evident as all laws act to encourage or discourage certain types of human behaviour. Behavioural changes can, and often do, have significant environmental impacts. Laws/regulations which are directed at environmental protection or management (for example, hazardous waste disposal) should, also, be subject to SEA. It should not be assumed that a law or regulation aimed at environmental improvement will be entirely beneficial. There may be indirect adverse effects which are not immediately apparent unless a systematic assessment of impacts is undertaken. Such an outcome can easily arise if a problem in one environmental 'sector' – for example, disposal of hazardous waste on land – is managed only by transferring it to another sector (for example, air quality).

7. TRANSBOUNDARY ISSUES

7.1 There are two main international instruments which require transboundary consultation, within an EIA context, on projects which will cause impacts outside the territory of the country in which a project will be located. These are the European Union Directive on EIA (Commission of the European Communities, 1985) and the Espoo Convention (UN Economic Commission for Europe, 1991) entitled the *Convention on Environmental Impact Assessment in a Transboundary Context*. The Directive applies only to Member States and establishes a common EIA procedure for them. One article of the Directive requires transboundary consultations, but does not give specific instructions as to how the consultations should be undertaken. It is left to the Member States to determine the *modus operandi* for the consultations.

7.2 In contrast, the Espoo Convention, which applies to all European countries, establishes a procedure in dealing with transboundary issues raised within all EIA studies. The Convention is, unfortunately, not yet in force. Since 1991 the number of signatory countries which have ratified the Convention has not yet reached the required target of 16 countries. The existing signatories have agreed, however, to follow the Convention requirements pending its entry into force.

7.3 The Convention defines a transboundary impact as, '.... any impact, not exclusively of a global nature, within an area under jurisdiction of a Party (to the Convention) caused by a proposed activity, the physical origin of which is situated wholly or in part within the area under the jurisdiction of another Party'. Impacts which are global in nature are not subject to this Convention, but some of these impacts should be included in EIAs under other requirements of the Conventions (see Chapter 8).

7.4 Appendix 1 of the Convention lists a number of projects (19 in total) which are likely to cause transboundary impacts. Whether they will do so depends on their location and the way in which they are constructed and operated. There is a presumption, however, that any EIA for such projects should address, automatically, the likelihood of transboundary impacts occurring. If such impacts are identified then they should be predicted and evaluated. The Convention does not list non-project activities in the Appendix, but recommends that when policies, programs or plans are being formulated the transboundary implications should be an integral part of any strategic EIA undertaken. Basically, the Espoo Convention requires that no project listed in the Appendix, which may have transboundary impacts, can be approved unless an EIA has been implemented. This EIA must provide an opportunity for all potentially affected countries to participate.

7.5 There are two basic types of project which can cause transboundary impacts. There are joint projects in which two or more governments are the proponents and which will be implemented to exploit a joint or shared resource such as a river. More commonly, there are projects which are promoted by a private sector company, a parastatal or a government ministry or agency and which are located entirely within one country.

7.6 In the former case a joint authority, commission or committee is often established to oversee project preparation, evaluation and implementation. This body commissions, on behalf of the co-operating governments, the necessary studies including EIAs. In such circumstances the joint and continuing involvement of the governments ensures that impacts in both countries will be investigated thoroughly. A model of how a bi-national strategic EIA has been undertaken is provided by the EIA implemented for development in the vicinity of the Victoria Falls in southern Africa (Box 14).

7.7 In the latter case, the situation is more complex. Some projects may be located at considerable distances from a national boundary, but still affect the territory of a neighbouring country through the long-range transport of pollutants in watercourses and via coastal currents and atmospheric circulation patterns. In EIAs, the impacts in the host country may be examined but the transboundary effects ignored (assuming they have been identified – which need not be the case). Other projects may be located close to a frontier with easily identifiable cross-frontier impacts. In such circumstances the likelihood of transboundary collaboration and consultation will depend on the status of relations between the concerned countries. The situation is more complicated if there are more than two countries involved.

7.8 The basic procedural model for transboundary EIA, as included in the Espoo Convention, allocates the lead responsibility for the EIA to the country in which a project is to be located (the originating country). Once a project with expected transboundary impacts is proposed, then the governments of those countries whose territory might be affected should be notified not later than the citizens of the originating country. The 'recipient' countries should respond, subsequently, by providing information on the social and environmental characteristics of the area likely to be affected. This information will be used to predict and evaluate the transboundary impacts. As work progresses and consultations occur (starting with scoping), it is recommended that the stakeholders of the recipient country(ies) are involved in the same way as their counterparts in the originating country. There is likely to be one major difference and that is the involvement of a government as an entity. This may cause some problems in that some governments may not wish to be involved in consultations on the same basis as non-governmental organizations or representatives of voluntary organizations. In some cases a government may initiate internal consultations, based on material provided by the originating country, and establish a common position to be expressed by it alone during the consultative process. Either way, the principle of cross-border consultation in the EIA is upheld.

7.9 Toward the end of the EIA, and prior to an approval decision, the views of the 'recipient' government(s) should be taken into account. Subsequently, the decision should be transmitted to the recipient government(s) and consultations would progress to arrangements for mutual co-operation in the project implementation and evaluation phase. In transboundary EIA, the role of co-operating governments in the post-approval phase is very important. The recipient governments will be very interested in the application of the agreed mitigation measures which will prevent or reduce the transboundary impacts. Some mechanism to enable the checking of the implementation and evaluation of mitigation measures is needed. Similarly, technical and institutional structures and procedures are needed to establish mutually agreed monitoring programs and mechanisms by which monitoring data are evaluated and, if necessary, corrective action taken to ameliorate potentially harmful situations.

Box 14 : Example of a Trans-Boundary EIA Study

The Victoria Falls are situated on the Zambezi River which forms the boundary (for part of its length) between Zimbabwe and Zambia. Indeed the boundary between the two countries bisects the river and the Falls. Both governments share the Falls as a resource which has strategic economic importance as a tourist attraction, for both countries, and as a significant feature of cultural value for local people.

In recent years, the pace of development at, and near, the Falls has caused increasing concern in terms of adverse environmental and social impacts. Ultimately, it was feared the Falls might be damaged both as an internationally important protected area and as a source of national incomes. Thus, both governments have agreed to prepare a Master Plan for sustainable development in the Falls area to be implemented jointly by the two governments. To assist preparation of this plan, it was decided that an EIA should be implemented to predict the cumulative environmental impacts of current and expected developments, up to the year 2005, for an area within a 30km radius of the Falls. The problem issues and areas ('hotspots') identified would provide the basis for formulating a Master Plan to guide development to ensure the predicted problems were avoided or reduced to an acceptable level.

To undertake this work the governments approached a 'neutral' third party, the IUCN - Regional Office for Southern Africa, for assistance. It was agreed that IUCN would co-ordinate, direct and manage the work for both governments. It would do so under the overall control of a steering group of senior government officials from the respective countries. This steering group would meet regularly during the EIA and related activities to review progress and determine subsequent work. It was agreed that the detailed EIA work would be undertaken by a team of local specialists from each country working under the direction of a team leader (an EIA specialist) from outside the region, but assisted by two local experts from the Zambian and Zimbabwean lead agencies respectively. By means of this institutional arrangement the two countries intend to ensure the impartiality of the work and to restrict their involvement to deciding matters of strategic principle. Matters of detail will be agreed in the context of the day-to-day work of the EIA team.

7.10 It is quite likely that disagreements and disputes will arise between governments. The Espoo Convention recommends that, when direct bi- or multi-lateral agreements cannot be achieved, a form of arbitration occurs. A special Commission of Inquiry, consisting of one or more representatives of each country and an independent individual (accepted by the other parties) should be established to examine the evidence and the viewpoints and issue a judgement. This judgement would be binding on all parties.

7.11 The Convention displays the usual characteristics of a legal document which tries to convert good EIA practice into a procedure which is acceptable to a range of countries with different laws and regulations. Consequently, debates and discussions on the nature of the provisions and the details of how they may be implemented have been continuing. Nevertheless, the Convention is important for two reasons:

- it establishes an internationally agreed set of minimum standards and principles for transboundary EIA; and
- it provides a model which can be applied, with necessary amendments, to other regions of the world.

8. SUSTAINABLE DEVELOPMENT AND EIA

INTRODUCTION

8.1 In 1987, the book *Our Common Future* (World Commission on Environment and Development) was published and since then the concept of sustainable development has become increasingly influential in the policies of national governments, bi- and multi-lateral agencies and non-governmental organizations. Since 1987, there is little doubt that the political debate on the need for, and challenges of, sustainable development has finished; sustainable development is now accepted, widely, as policy. Translating policy aims and commitments into effective action and results is still, however, a considerable obstacle. The difficulty centres on identifying sustainable development, in specific cases, and how it might be achieved.

8.2 It is not possible to investigate the main issues raised by the concept of sustainable development in this chapter. Given that sustainable development is now widely accepted as policy it is appropriate, instead, to review concepts and actions which have been formulated and implemented to pursue this policy. Such a review would enable the basic features of current thinking and practice to be identified and, subsequently, the potential contribution of EIA to be identified. From this perspective, the following are central and key aspects of sustainable development:

- it is a goal to be reached rather than an initiative or project to be implemented;
- strategies, approaches and tools are needed to help achieve this goal;
- it is concerned that future generations do not have reduced access to resources and development options, compared to the current generation; and
- it focuses on the current and future stocks of natural, social and economic capital and processes/functions which link environmental, social and economic systems and which support any attempts to enhance human welfare via development.

KEY OPERATIONAL CHARACTERISTICS OF SUSTAINABLE DEVELOPMENT

8.3 An analysis of actions to assist achieving sustainable development shows an emphasis on capital stocks and processes. The three types of capital stock are:

- *Social capital* – culture (including technical knowledge) and functional institutions to maintain, enhance and impart culture especially in relation to management of natural resources;
- *Economic capital* -- basically money and human-made production facilities (eg factories); and
- *Natural capital* – which can be divided into two types: sources of renewable and non-renewable materials (forests, minerals) and functions which provide a service such as 'sinks' (processes by which wastes are assimilated and re-cycled).

8.4 All three forms of capital are important, but it is now realised, increasingly, that natural capital may be a determining factor and that social and economic capital will be depleted if natural capital is impaired or damaged significantly and irreversibly. There is not a general consensus on this point – some economists and other specialists may dissent from this view. However, the dominant thrust of decision-making and practical action in the context of the pursuit of sustainable development would appear to support this position. In essence, this viewpoint is based on the 'precautionary principle' which suggests that it is best to avoid a possible problem rather than wait for a definitive answer which proves whether or not the problems exists. By that time it may be too late. The use of the precautionary principle has gained considerable force in recent years. To take account of this principle, the natural, biophysical environment has moved into a central position in terms of judging whether or not a certain development path appears to be sustainable. Therefore, the concept of environmental sustainability has received considerable attention and would appear to be very relevant in the context of the application of appraisal tools such as EIA, which have the natural, biophysical environment as a main focus. Of course, the increasing use of integrative EIA will extend the ability to make judgments on sustainability which deal with social and economic factors as well as natural, biophysical environmental issues.

LINKING EIA AND SUSTAINABLE DEVELOPMENT

8.5 Environmental sustainability, therefore, should be viewed as an 'enabling condition' which helps achieve sustainability in development. There are three current mechanisms or tools which, when used together, can help to determine the extent to which a proposed course of action is sustainable. These tools are:

- integrative SEA and project EIAs;
- natural resource accounting; and
- sustainability criteria and/or guidelines for resource management (which incorporate the concepts of limits and capacities).

Integrative SEA and Project EIAs

8.6 To move forward toward sustainability it is imperative that economic and environmental appraisals are closely integrated and the appraisal work is done early in the project life cycle. There is an urgent need for integrated appraisal to assist the project design process and the approval decision-making procedure. The earlier this work can begin the more likely it is that the final option or alternative is sustainable. In some sectors, identification of sustainable options is relatively easy – for example, in the energy sector where energy conservation measures are a viable alternative to new generating capacity. In other sectors, such alternatives may only be identified after considerable appraisal work.

8.7 SEA is, by its nature, 'anticipatory' rather than reactive. So, for example, an energy sector SEA can include easily the energy conservation alternative. Carefully and systematically conducted SEAs can overcome, to a great extent, the current focus on impacts of individual developments (much of which can be considered unsustainable). Project EIAs cannot alter, as easily, the identification and pursuit of such projects. SEAs are implemented as they can do so; they can be directed at the source of development initiatives which are causing environmental deterioration.

8.8 It has been stated that EIA is a tool for sustainable development. It assists countries move towards achieving this goal by identifying gains and losses to the three types of capital. EIA focuses attention on alternative uses for these types of capital and enables decision-makers to see, clearly, the implications of resource use. Through the analysis of alternatives (and, especially, those which may 'arise' during EIA work) the most appropriate use of a resource (capital) may be identified. In a very real and practical sense EIA, can help all countries 'capture' the real benefits of their resources.

Natural Resource Accounting

8.9 Integrated SEA or project EIAs could make a more useful contribution to decision-making if they were linked to national natural resource or environmental accounting systems. Basically, to help achieve sustainability it is important to use environmental accounting at the macro-economic level and integrated forms of SEA and EIA at both

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the macro- and micro-economic levels. Currently, in most countries, economic growth is measured by Gross Domestic Product (GDP). GDP measures trends in economic activity, but does not include depletion and degradation of natural capital (that is environmental resources and services). It is, therefore, an inaccurate measure of 'true' sustainable income. In addition, the costs of cleaning up pollution and restoring a degraded area raise rather than lower national income in GDP terms. These expenditures would not have been necessary if degradation had not occurred.

8.10 Unsustainable economic growth results in a depletion and degradation of natural resources (for example, loss of topsoil and over-fishing of economically valuable species) and environmental services (for example, the sink service provided by the atmosphere and water bodies by absorbing and eliminating wastes). Sink constraints are increasing everywhere as more and more use is made of this environmental service.

8.11 It is only when resources and services are maintained that sustainability can be achieved. These issues are of particular relevance to developing countries because their economies are more directly linked to natural resource use than those of more industrialised nations.

8.12 Currently, the system of national accounts treats reduction, and even liquidation, of natural capital as income. Environmental accounting, via a system of natural resource accounts, separates these issues and allows the rate and extent of environmental degradation and resource depletion to be identified. This information assists economic planners to identify situations where liquidation of resources (particularly renewable resources) exceeds regeneration rates and, also, to determine sustainable use rates. The exploitation and stock depletion of non-renewable resources (for example, oil and gas reserves) requires special analysis within an environmental accounting framework.

8.13 Implementation of environmental accounting systems is not easy and although there is extensive theoretical knowledge, there is only limited practical experience. However, a considerable amount of innovative work is being done by international organizations, academics and national governments to develop appropriate techniques and systems applicable to different situations. Valuation is difficult and initial estimates will be partial. However, this should not prevent their use (on the basis of the precautionary principle) and the situation will improve as experience is gained and more data obtained.

8.14 To maximise the role of EIA in sustainability decision-making it must be linked to environmental accounting. The first step is to have an operating system of environmental accounts to act as 'baseline' against which changes, caused by proposed development projects acting either singly or cumulatively, can be evaluated in terms of their overall implications for the resources/sinks. A similar analysis can apply to proposed policies, programs and plans which are expected to have direct environmental implications or indirect implications through changes in socio-economic behaviour patterns. EIAs will present quantitative data on such issues as:

- land-take;
- raw material inputs and sources;
- traffic generation;
- waste discharges to air, water and land;
- impacts of discharges on receiving systems; and
- impacts on resources used by local communities and likely substitute sources of income.

8.15 With this type of information it will be possible to obtain a 'picture' of the impact on environmental resources and sinks. Estimated changes in these factors can be considered in relation to information on their status and trends, based on the environmental accounts. In this way the consequences of the proposals can be evaluated for importance in an overall national policy context which incorporates basic sustainability principles. Should a proposal be accepted, then the environmental accounts will be amended to reflect these changes and then act as a baseline for future development-related decision-making.

Sustainability Criteria

8.16 As a concept this is not difficult to understand, but it is not at all easy to incorporate it, meaningfully, into practice. Our knowledge and understanding of environmental capacities, limits and thresholds is very limited and it is not possible to predict, in many cases, whether any limits will be exceeded. At best we can make informed, expert judgements based on qualitative interpretations of past experience extrapolated into the future. The precautionary principle requires, however, that such judgements be considered, seriously, in the approval process.

8.17 In addition to the linkage between EIA and natural resource accounting, a similar relationship can be identified focusing on natural capital and ecological processes. It is possible, based on certain assumptions, to identify natural resource units or other kinds of systems with identifiable natural boundaries and determine standards, limits or quality objectives which will be used to maintain them in a socially desired state. When possible these can be based on studies to determine carrying capacities. As part of this work it is necessary to identify indicators which reflect the status of the units/systems and which can be monitored to track any changes over time. In that way adverse/beneficial trends in their status can be identified early and, if necessary, remedial action initiated.

8.18 To make this approach work it will be necessary to use either cumulative EIAs or SEAs, on a regular basis, for development initiatives in these areas. Project EIAs alone will not be very useful; SEAs would be most effective. Regular, but not necessarily frequent, use of SEA will enable predictions to be made on how the indicators may change. The direction and magnitude of predicted changes can be used to inform decision-makers of the implications of different development options. The pre-determined standards, criteria or quality objectives and predictions of changes in their status can be seen as providing, collectively, a form of sustainability test. Our current inability to develop scientifically justifiable criteria and standards means that 'hard and fast' answers on sustainability will not be possible. Instead, only informed judgements on the direction (toward or away from sustainability) of development-induced changes will be possible. Again, the precautionary principle would seem to support the use of such judgements until our knowledge base improves and better, more precise tools or approaches become available.

8.19 There is a vast literature on the identification, scope and use of indicators to assist achieving sustainability. It is not appropriate to discuss many issues here. Instead, brief attention is focused on the types of indicators which may be used in decision-making following completion of an EIA or SEA.

8.20 Indicators may focus on the biophysical environment, health and socio-economic dimensions. They may relate to the local level (for example, a community) or the national level. Usually, indicators are devised and used to determine whether an action moves toward or away from sustainability criteria. These indicators are

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generally termed sustainability indicators although they are merely 'neutral' ways of measuring change, or a potential change, against the criteria. Box 15 shows a simple generic list of criteria and indicators. Box 16 shows a list of more specific indicators (relating to bio-diversity) which could be derived from a generic list and be used in EIAs at a local/regional level. In the pre-approval decision stage of a project, subject to an EIA, such indicators can be used to aid decision-making.

Box 15 : Criteria and Indicators of Environmental Sustainability

Population Stability: No net increase in population over some planning time horizon.

Greenhouse Gases: No net increase in concentration of greenhouse gases in the atmosphere, beyond some limit. Fossil fuel use to fall to very low levels.

Acidification: No net increase in acidification (hydrogen ion concentration) in surface waters and soils, beyond some limit.

Toxic Substances: No net increase in toxic chemical and heavy metal concentrations in soil and water, beyond some limit.

Soil Degradation: No net topsoil erosion beyond some limit; no reduction of fallow period below some limit.

Aquifers: No net depletion of aquifers beyond some limit.

Natural Ecosystems: Preservation of all or most remaining natural forests, estuarine areas, coral reefs, and other ecologically critical biomass or ecosystems.

Species Extinction: As a general rule, no further humanly induced extinctions of other species.

From: Daly, H and R. Goodland, (1993)

Box 16 : Examples of Indicators to be Used for EIAs : Biodiversity

Abundance and ranges of threatened, rare or endangered species (no reduction).

Addition of species to official lists (eg Red Lists) of threatened, rare or endangered species through reduction in abundance or ranges of all species (no net addition).

Phosphate discharge loads to freshwater (no overall increase measured against a specific limit).

Recovery of economically valuable fish stocks (no threat to rate of recovery).

8.21 Once a decision is made and a project or action is implemented there may be a need to evaluate its performance against sustainability criteria. In many developing countries and countries with economies in transition this task may be made easier by concentrating on identifying and measuring performance against non- or un-sustainable indicators. In general, it is easier to detect an action which is non-sustainable as opposed to one which is sustainable. Box 17 shows a list of non-sustainable indicators.

Box 17: Examples of Socio-Economic Indicators of Unsustainability

Levels of conflict between individuals and groups over common property resources.
Time needed by women and children to obtain and transport water and/or fuel wood.
Appearance of new or larger market for local resources when none existed previously.
Length of time allocated to fallow periods where shifting agriculture is practised.
Amount of voluntary participation in maintenance activities.

From: Eckman, K. (1993)

8.22 The use of limits, thresholds and capacities allows implementation of some basic rules which can be used to judge environmental sustainability. These rules refer to the input/output characteristics of a proposed development:

- Output Rule
  Waste emissions from a project(s) should be within the assimilative capacity of the local environment to absorb them without unacceptable degradation of its future waste absorptive capacity or other important services.

- Input Rule
  Harvest rates of renewable resource inputs should be within the regenerative capacity of the natural system that generates them; and

  depletion rates of non-renewable resource inputs should be equal to the rate at which renewable substitutes are developed by human invention and investment (part of the income from liquidating non-renewables should be allocated to research to develop sustainable substitutes).

These rules are very general and will be difficult to apply in many situations because of the complexities of individual cases in which SEA/EIA is applied. However, they are a start and can be a framework for orienting decision-makers toward incorporating sustainability tests and criteria in their decisions.

8.23 The linkage between EIA and sustainability has produced one further basic rule or 'principle' which is increasingly becoming accepted, although by no means universally applied. Basically, biophysical environmental impacts are seen as reductions (large or small) in natural capital (Sadler, 1995). Natural capital is seen as limitied and, therefore, a decision priority is to maintain current levels of natural capital (a no 'net loss' rule) by ensuring, to the extent possible, that impact management plans contain measures and actions to offset these 'losses' by an equivalent investment in resource conservation, rehabilitation, enhancement or creation. Examples of such measures could be the creation of a wetland, off-site, to compensate for damage to an existing wetland by a proposed development.

EIA PROCEDURES AND SUSTAINABILITY

8.24 In the above sections attention has focused on the issue of making decisions regarding the sustainability of specific development projects or initiatives. A number of tools were discussed, one of which was the application of EIA, in various forms, as an appraisal method and decision-making aid. It is clear, however that globally we are in our 'infancy' in terms of judging whether a particular project/initiative moves an area or a country away from, or towards, the achievement of sustainability.

8.25 Governments and multi- and bi-lateral agencies are using a range of mechanisms in their pursuit of sustainability. One prominent initiative is the formulation, and implementation, of various kinds of strategies for sustainability at national, regional or local levels. There are many varieties of strategy and the documents/reports which are prepared to present the results and guide the implementation have a range of titles:

- national sustainable development plans;
- Agenda 21s;
- national conservation strategies;
- (national) environmental action plans; and
- environmental policy plans etc.

8.26 Although varied, it has been found that the more successful strategies, in terms of in-country effectiveness, have many common objectives and characteristics. The main goal of strategies can be summarized as being to improve the well-being of people and ecosystems by mobilising all relevant stakeholders to build a strategy and co-operate in its implementation.

8.27 Preparation and implementation of these strategies requires:

- cross-sectoral integration of economic, social and environmental factors;
- stakeholder consultation and participation (including the public);
- transparency in discussion and debate on priorities and needed actions; and
- creation and utilisation of technical and institutional capacities to prepare and implement them.

Figure 3 shows the basic elements needed for strategy preparation and implementation.

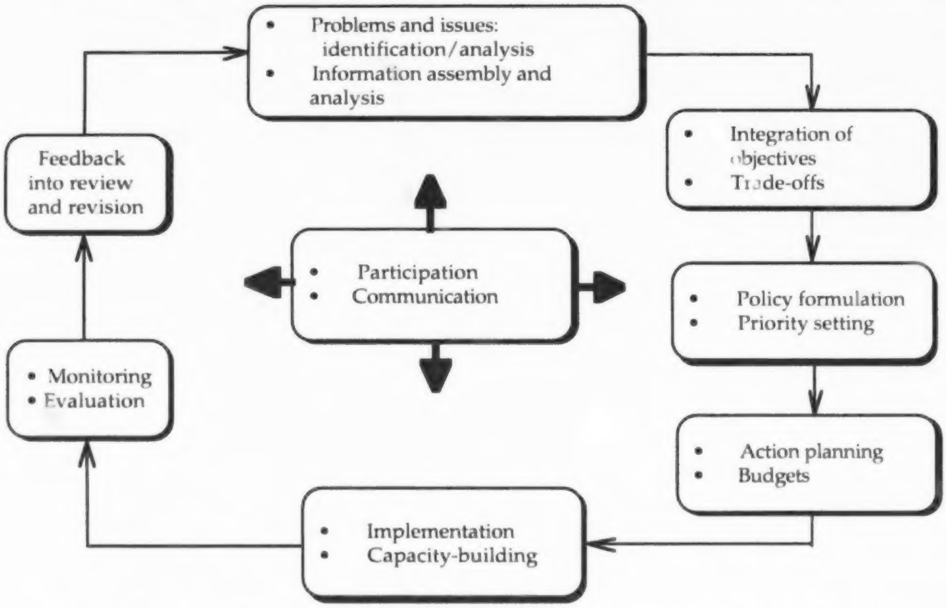
• Problems and issues: identification/analysis
• Information assembly and analysis
• Integration of objectives
• Trade-offs
• Policy formulation
• Priority setting
• Action planning
• Budgets
• Implementation
• Capacity-building
• Monitoring
• Evaluation
Feedback into review and revision
• Participation
• Communication

Figure 3 : Strategy Preparation and Implementation (from Carew-Reid *et al.*, 1994)

8.28 Experience in creating strategies has shown that their likelihood of success is enhanced if certain activities are initiated and implemented before the complete strategy is formulated (Carew-Reid, et al., 1994). It is best to avoid a rigid, linear progression of activities undertaken in a sequence. Instead, a multi-track process where many strategy components are implemented simultaneously (and as early as possible) has been found to be beneficial. One major benefit has been gained by starting various institutional and technical capacity-building initiatives as soon as possible after a decision to initiate a strategy for sustainability. The creation of these capacities not only is needed to implement the strategy, but can be extremely useful and influential in 'building' the strategy (in a technical sense). More importantly, perhaps, it generates enthusiasm for the strategy and enhances a sense of ownership and commitment to it amongst those involved in the capacity-building.

8.29 In many cases where a strategy for sustainability is being prepared and implemented, EIA is identified as an important priority, either in terms of introducing EIA systems or enhancing existing EIA procedures. In a number of countries – for example in

Nepal – capacity-building has centred on the creation of an EIA system suited to Nepali needs and conditions and an indigenous, technical capacity to prepare and review EIA reports and to use them effectively in decision-making (see Box 3).

8.30 Evidence to date shows the utility of focusing on the development of EIA procedures as a major activity in development of a strategy for sustainability (Carew-Reid *et al.*, 1994). It seems to be particularly effective during the early phases of strategy development. EIA, as an institutionalised process, shares many of the objectives and characteristics of strategies for sustainability. In particular, EIA has cross-sectoral application, integrates social, economic and biophysical environmental issues and incorporates extensive stakeholder consultations and, occasionally, participation in decision-making. To some extent, therefore, EIA is a microcosm of activities involved in preparing and implementing strategies for sustainability.

8.31 Using the development or enhancement of EIA procedures as a capacity-building exercise has a number of advantages and benefits. Firstly, EIA is seen as an important global activity which is attractive to most governments. There are, also, many diverse pressures on national governments to introduce EIA systems. Further, EIA is seen by most government staff members as being a technically interesting and challenging activity and, usually, they are keen to be involved in devising an appropriate national EIA system, particularly one which will be developed and tested by them and not devised wholly or in part, by external, expatriate consultants. Also, EIA is not a threatening activity to any specific development sector or line ministry, agency or parastatal. It applies to them all and requires collaboration, co-operation and joint working amongst all participants in the EIA capacity-building process. Such joint sharing of experience, views and collaborative working over time (may be 2-3 years) to achieve an agreed, desired objective has many benefits:

- sharing of experience;
- building commitment to EIA;
- building EIA technical capacity; and
- creation of an indigenous EIA system.

8.32 EIA also acts as a vehicle to build commitment and support for the objectives of a strategy for sustainability. The activities undertaken by the EIA 'group' expose them to wider issues of development and the environment including the need for sustainability. The EIA-oriented work widens the horizons of the participants and they become effective messengers and activists in terms of promoting and delivering sustainability. In the long term, many of the participants will be promoted within government and move to senior positions in sectors such as industry and education. This means that their support and commitment moves with them to jobs where they may have considerable influence over future governmental policy-making and policy implementation. The sustainability message and ethos, thus, is carried forward and, perhaps, made even more effective. To summarize, a co-ordinated, indigenous initiative to develop, or even enhance, EIA procedures can make a significant contribution to the incorporation of sustainability principles in national and sub-national decision-making on development.

EIA AND LARGE-SCALE GLOBAL IMPACTS

8.33 It is still unusual for transboundary impacts to be considered in national level studies, whether SEAs or project-level EIAs. It is very rare, indeed, for such studies to include impacts at the international or global level. However, there is growing concern about

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a number of global environmental changes which are caused wholly, or in part, by development-related actions:

- global warming due to increased concentrations of the so-called greenhouse gases, such as CO2 and CH4 (methane), and its likely consequences;
- depletion of ozone (O3) and periodic appearance of ozone 'holes' due to increased concentrations of chlorofluorocarbons (CFCs);
- acidification of water bodies; and
- decline in global biodiversity.

8.34 It would seem to be clear that SEA is the most appropriate mechanism to deal with the possible contribution of a range of development-related initiatives to these changes. Project-level EIAs have much less potential in terms of deciding whether a proposed project will make a significant adverse contribution to any of these global trends.

8.35 How can SEA/EIA practice be amended, adapted or extended to enable a proper consideration of global environmental changes to be undertaken? The answer depends, to a great extent, on other approaches taken to deal with these changes. Considerable international/national effort has been spent in devising international conventions (for example, on climate change and biological diversity), and similar agreements which commit governments to various targets, - for example, in the amount of certain chemicals which are emitted or discharged either directly, or indirectly, into the atmosphere. Here, the role of EIA will be examined in relation to:

- atmospheric impacts; and
- biodiversity impacts

and how it relates to international actions to deal with these global problems.

Atmospheric Impacts

8.36 Once individual governments have agreed on national 'production' targets, then the production of chemicals (such as gases discharged to the atmosphere) can be monitored to determine whether the targets are being applied effectively. Future developments may affect the amounts emitted. The application of SEA/project-level EIAs will allow decision-makers to take account of incremental increases in the amounts discharged and, therefore, judge whether any additional inputs will cause a target to be exceeded. The target can be used as a determinant of impact significance. If a target were to be exceeded then action may be taken to reduce existing contributions from other sources.

8.37 An alternative or complementary approach is to predict the effect of an expected contribution from a proposal to existing concentrations of chemicals of global concern. A global average increase may be calculated, for example, from an SEA of an energy sector investment strategy or a regional development programme. Decisions on the acceptability of the expected increase in concentrations can be made. However, it is to be hoped that it would be unnecessary to make such decisions. The precautionary principle would seem to impose an imperative to reduce, to the extent possible, all contributions to global environmental damage without any need to consider whether additional increments are acceptable or not. This approach stresses the need for the application of EIA/SEA as early as possible in the identification and appraisal of alternative development options.

8.38 In terms of greenhouse and other gases, it is possible to obtain emission coefficients (for example, from the US Environment Protection Agency) for different processes – for example, the amount of CO2 emitted per unit of electrical energy produced for various energy-generating processes. Using such data enables an informed choice to be made and, if economic feasibility is not affected, the option producing the least amount of gaseous emissions would be approved. It is important to consider gases individually as well as collectively as their individual contributions to the extent of global environmental changes can vary significantly.

8.39 If a contribution to a global environmental change is unavoidable then non-project-specific mitigating measures can be considered. There is little practical experience available on the types and success of such measures, but some may be appropriate in certain circumstances. An example is the use of carbon 'offsets' when global carbon sink capacity is enhanced to neutralise additional carbon contributions, for example by creation of a forest. However, it may be necessary to assess the impacts of the proposed forest – depending on its size and location! Alternatively, efforts may be made to reduce or eliminate emissions from existing operational facilities, thus ensuring no net change in the contribution to global concentrations from a specific locality.

8.40 In the case of acidification, it is necessary to make calculations of the possible contribution of the main gases (SO2 and NOx) which cause acidification. It will be essential to use appropriate dispersion models to predict concentrations in sensitive localities. In some cases this may involve transboundary assessment and consultations. Once these have been undertaken a judgement on significance may be made and mitigation measures enacted, if considered necessary. Alternatively, the approach outlined above for greenhouse gases can be used and a decision made to minimise production of the gases by 'automatic' selection of the option emitting the lowest amounts.

BIODIVERSITY IMPACTS

8.41 At the 1992 UN Conference on Environment and Development, the Convention on Biological Diversity was opened for signature. The Convention, which entered into force on 29 December 1993, includes a requirement that each contracting party '... *Introduce appropriate procedures requiring environmental impact assessment of its proposed projects that are likely to have significant adverse effects on biological diversity...*' Global biodiversity refers to all living organisms and, in particular, existing genetic variety and the accompanying potential for future variation through evolutionary change in the existing genetic material. As living organisms are dependent on functioning biophysical processes such as the global geochemical cycle and ecosystems, variability in these processes and systems is a component of biodiversity. Biodiversity is a resource which, it is generally agreed, needs to be passed to future generations so that its full potential can be assessed and utilised. Conservation of existing biodiversity is, therefore, a basic principle of sustainability.

8.42 Until recently, ecological impacts were predicted and evaluated in virtually all EIAs. The Convention on Biological Diversity, and the accompanying increase in global concern for biological diversity, has broadened and deepened the scope of our understanding of ecological impacts and, more importantly, increased and emphasised its prominence and importance in relation to other impacts and as a factor in decision-making.

8.43 The assessment of biodiversity impacts can build on the considerable experience gained in assessing ecological impacts. Consideration of biodiversity issues is an extension or elaboration of current good practice is assessing ecological impacts. It is not a completely new topic requiring a major reorientation and learning on the part of those involved in EIA. The following specific aspects of biodiversity will need to be considered when assessing biodiversity impacts (many would have been included in an 'old-style' assessment of ecological impacts):

- taxonomic diversity – the range of micro-organisms and plant and animal species in an ecosystem or area;
- genetic diversity – the range of genetic characteristics found in a population or species;
- ecosystem diversity – the range of interacting natural systems (for example, lake/wetlands and forest/lake) present within a region, landscape or the biosphere;
- ecosystem functions – the interactions provided by species and ecosystems with other species; the relationship between local species and systems and global support systems; and
- abiotic matrix – effects on the non-living portion of the soil, water, atmosphere and biophysical processes which support species and ecosystems.

8.44 The altered focus provided by the biodiversity concept in EIA can be shown best by the following range of questions to be considered in EIAs (adapted from by the Canadian Environmental Assessment Agency, 1995):

- What impact will the proposal have on the genetic composition of each species? Are different genotypes of the same species likely to be isolated from each other? To what extent will habitat or populations be fragmented?
- How will the proposal affect ecosystem processes? Is this proposal likely to make the ecosystem more vulnerable or susceptible to change?
- What abiotic impacts will occur – change in seasonal flows, temperature regime, soil loss, turbidity, nutrients, oxygen balance etc.?
- Does the proposal contribute to or undermine sustainable use of biological resources?
- Does the proposal set a precedent for conversion to a more intensive level of use of biological resources for the area?

8.45 It will be seen there is emphasis placed on genetic composition and sustainable use of biological resources. Interestingly, the Canadian Environmental Assessment Agency, in its draft *Guide on Biological Diversity and Environmental Assessment* advocates the use of the 'no net loss' principle in relation to biodiversity, in decision-making and in formulation of mitigating measures.

8.46 The increasing emphasis given to biodiversity at local, regional, national and global scales, and its links to sustainability, show the importance of assessing the cumulative impacts of development. Biodiversity is, perhaps, the component of the environment most at risk from the cumulative effects of different impacts either from one proposal or many proposals likely to operate in the same area, or affect the same resource (for example, a series of pulp mills on a river). The realisation that biodiversity acts as an impact 'integrator' and, therefore, indicator of environmental change will add urgency to the need to improve SEA and increase its use.

8.47 There is another implication which has, until now, received little attention in the EIA literature, but is likely to gain increasing prominence particularly in developing countries and those in economic transition. EIA focuses on 'big' projects and SEA on policies, programmes and plans or on areas likely to be affected by multiple projects (usually large in scale). Most of these development-related actions in developing countries and those in economic transition are funded by the public sector with loans or other forms of financial assistance from the multi- and bi-laterals.

8.48 The overall contribution of external development assistance (loans etc) to global investment is only 5 per cent approximately. Public sector finance supplements this amount, but the biggest source of investment is from the private sector and a significant proportion of this investment supports small-scale projects and actions. At present, in many countries these small-scale projects are not 'caught' by EIA procedures and no environmental analysis influences their design or implementation. It is the cumulative and incremental effects of these types of projects which are the greatest threat to national and, ultimately, global biodiversity and environmental integrity – not the 'big' projects subject to EIA laws or regulations.

8.49 Finding strategies to 'capture' this aspect of the development process within EIA or, perhaps, in more broad terms an 'environmental review' system, will be a major challenge in the next few years. There are already a number of innovative approaches being discussed, but not yet being implemented effectively or widely.

8.50 The type of approach used will vary with the context. For example, in many urban areas there are land-use plans with areas zoned for industry and there are reasonably effective authorities responsible for control of development. In such situations, the authorities might be able to develop simple procedures for EIA or environmental review under a by-law or under existing legislation covering environmental health, planning or protection of sensitive or valuable environmental resources such as water. At present, the UNEP Industry and Environment Office is preparing advice for the industrial sector aimed at small to medium size enterprises.

8.51 In rural areas, the situation may be more complex as there may be little or no institutional capacity to control development. However, there are signs that appropriate management frameworks can be established in certain countries. For example, in many eastern and southern African countries there is a trend to devolve and decentralise power and decision-making away from the main administrative centres. For example, Uganda has decided to entrust local authorities with the management of natural resources and there has been a proposal to establish District Environment Committees responsible for:

- preparing district environmental action plans;
- co-ordination of environmental activities within the district;
- initiation of environment by-laws; and
- preparation of annual 'state of the environment' reports on the district.

In each district there would be officers responsible for natural resources, forestry, agriculture etc.

8.52 This administrative structure, and the available expertise, provides a context within which the incremental effects of small-scale projects could be managed effectively so that critical local and national ecological thresholds were not exceeded. Basically, an environmental action plan would establish principles and policies to guide development. Simple environmental review procedures (based perhaps on a simple checklist of questions) could be applied by the district officers to individual proposals to assist 'authorisation' decisions and guide project design and possible implementation. The need to prepare state of the environment reports would require periodic evaluation of environmental conditions and the results would be 'fed back' into environmental plan modifications and the criteria used to make decisions on project proposals. For example, criteria used to judge the acceptability of small-scale dams for livestock watering may need to change if the combined effect of a number of such dams is considered to be damaging water or other resources.

8.53 It is clear that there is no single solution to the problem of small-scale incremental development. Each context will require its own strategy. It is obvious, however, that there is a need for simple approaches to project appraisal which can be used effectively, quickly and efficiently by non-specialists. It is unlikely that such approaches will need all the checks and balances which characterise national EIA procedures for large-scale projects. The exact form and scope of these approaches must be tailored to local realities. Devising such approaches will be a challenge for the latter half of the 90s and the early years of the new millennium. Success in this endeavour is vital for the maintenance of biodiversity and the sustainable use of global environmental resources.

9. GLOSSARY

Acronymns

AEAM	adaptive environmental assessment and management
AEC	African Economic Community
CBA	cost benefit analysis
CEA	cumulative effects assessment
CIA	cumulative impact assessment
CEAA	Canadian Environmental Assessment Agency
CEQ	US Council of Environmental Quality
EC	European Community
ECE	Economic Commission for Europe
EIA	environmental impact assessment
EIS	environmental impact statement
EMP	environmental management plan
EMP	environmental monitoring plan
EMS	environmental management strategy
EMS	environmental management system
EO	environmental overview
EPA	Environment Protection Agency
ESCAP	Economic and Social Commission for Asia and the Pacific
FONSI	finding of no significant impact
GEF	Global Environment Facility
GIS	Geographical Information System
HIA	health impact assessment
IAIA	International Association for Impact Assessment
IAMM	impact assessment, monitoring and management
IRM	integrated resource management
MASAQHE	major action significantly affecting the quality of the human environment
NEAP	National Environmental Action Plan
NEPA	National Environmental Policy Act
NEQA	National Environmental Quality Act (Thailand)
NGOs	Non-government organisations
NSDS	national sustainable development strategies
OECD	Organization for Economic Cooperation and Development
PADC	project appraisal for development control system
PFF	project formulation framework
SAP	structural adjustment programs
SEA	strategic environmental assessment
TNA	training needs analysis

ToR	terms of reference
UETs	ultimate environmental thresholds
UNCED	United Nations Conference on Environment and Development (1992)
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
USAID	United States Agency for International Development
VECs	valued ecosystem components
WCS	World Conservation Strategy

abiotic

Non-living eg rocks or minerals.

ameliorative measures

See mitigation.

alternative

A possible course of action, in place of another that would meet the same purpose and need of the proposal.

audit

See environmental audit.

baseline studies

Work done to collect and interpret information on the condition/trends of the existing environment.

benefit-cost analysis

A method of comparing alternative actions according to the relative costs incurred (technical, environmental and economic) and the relative benefits gained. The analysis can incorporate discounting calculations to take into account the time value of money.

biodiversity

See biological diversity.

biological diversity

The variety of life forms, the different plants, animals and micro-organisms, the genes they contain and the eco-systems they form. It is usually considered at three levels: genetic diversity, species diversity and ecosystem diversity.

biophysical

That part of the environment that does not originate with human activities (eg biological, physical and chemical processes).

biota

All the organisms, including animals, plants, fungi and micro-organisms in a given area.

carrying capacity

The rate of resource consumption and waste discharge that can be sustained indefinitely in a defined impact region without progressively impairing bioproductivity and ecological integrity.

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coherence in EIA

Aiming to achieve the co-ordination of EIA procedures, guidelines, standards and criteria by those involved in funding or approving proposals.

compensation

Trade-offs between different parties affected by proposals to the mutual satisfaction of all concerned.

cost-benefit analysis

See benefit-cost analysis.

cumulative effects assessment

The assessment of the impact on the environment which results from the incremental impact of an action when added to other past, present or reasonably foreseeable actions regardless of what agency or person undertakes such actions. Cumulative impact can result from individually minor but collectively significant actions taking place over a period of time.

decision-maker

The person(s) entrusted with the responsibility for allocating resources or granting approval to a proposal.

development proposals

Consists of a wide range of human activities which provide (a) favourable conditions for an increase in the transformation of the natural, biophysical environment to provide the goods and services available to society (eg. Structural adjustment programs, 'rolling' development plans) and (b) actions which directly produce the goods and services.

discretionary process/decision

A process or decision which the decision-maker is able to base on personal preference.

ecological processes

Processes which play an essential part in maintaining ecosystem integrity. Four fundamental ecological processes are the cycling of water, the cycling of nutrients, the flow of energy and biological diversity (as an expression of evolution).

ecosystem

A dynamic complex of plant, animal, fungal and microorganism communities and associated non-living environment interacting as an ecological unit.

endemic

Restricted to a specified region or locality.

environment

There is no generally agreed definition of environment in EIA. Increasingly, it means the complex web of inter-relationships between abiotic and biotic components which sustain all life on earth, including the social/health aspects of human group existence.

environmental audit

Process focusing on an existing installation, facility, or activity which involves a systematic, periodic evaluation of environmental management to objectively review the performance of an organisation, management and equipment with the aim of safeguarding the environment.

environmental assessment

See environmental impact assessment.

environmental impact assessment (EIA)

The systematic, reproducible and interdisciplinary identification, prediction and evaluation, mitigation and management of impacts from a proposed development and its reasonable alternatives. Sometimes known as environmental assessment.

environmental impact report/statement

Document in which the results of an EIA are presented to decision-makers and, usually, the public.

environmental management

Managing the productive use of natural resources without reducing their productivity and quality.

environmental management plan

See impact management plan.

environmental management system

A structured approach for determining, implementing and reviewing environmental policy through the use of a system which includes organisational structure, responsibilities, practices, procedures, processes and resources. Often formally carried out to meet the requirements of the ISO 14000 series.

fauna

All of the animals found in a given area.

flora

All of the plants found in a given area.

health impact assessment

Component of EIA which focuses on health impacts of development actions. Most attention is concentrated on morbidity and mortality, but increasingly, the World Health Organization (WHO) definition of health as being a state of 'social, physical and psychological well-being and not just the absence of disease' is being used to guide this type of assessment work.

impact management plan

A structured management plan that outlines the mitigation, monitoring and management requirements arising from an environmental impact assessment.

impact monitoring

Monitoring of environmental/social/health variables, which are expected to change after a project has been constructed and is operational, to test whether any observed changes are due to the project alone and not to any other external influences.

initial environmental evaluation/examination

A report containing a brief, preliminary evaluation of the types of impacts that would result from an action. Often used as a screening process to assess whether or not proposals should undergo full scale EIA.

interdisciplinary team

A group of people, from a range of disciplinary backgrounds, working together to ensure the integrated use of the natural and social sciences and the environmental design

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arts in planning and in decisionmaking which may have an impact on man's environment.

level of assessment

See tiering.

memoranda of understanding

A written agreement between two or more levels or areas of government.

mitigation

The purposeful implementation of decisions or activities that are designed to reduce the undesirable impacts of a proposed action on the affected environment.

monitoring

Activity involving repeated observation, according to a pre-determined schedule, of one or more elements of the environment to detect their characteristics (status and trends).

'moving' baseline

Existing state of the environment projected into the future assuming no development proceeds. The projected baseline situation, rather than that existing at the time of EIA work, is theoretically the one to be compared with the state of the environment predicted in the event of a development action proceeding.

natural resources

Features that have ecological, economic, recreational, educational or aesthetic value.

natural resource accounting

Transformation of data, on environmental features (components and processes) and renewable/non-renewable resources, into a form that is comparable with data on the economy. Incorporation of the environmental data into the standard set of economic accounts (eg. gross national product) used in government policy-making.

NEPA

National Environmental Policy Act 1969 of the United States of America. This Act, which applied to Federal US agencies, was the first policy to require the preparation of a statement of the predicted environmental impact of a proposal. This statement has since become known as the Environmental Impact Statement (EIS).

precautionary principle

A principle of sustainability that where there are threats of serious or irreversible damage, the lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation.

proponent

Organisation (private or public sector) or individual intending to implement a development proposal.

proposal

Any project, policy, program, plan or other activity.

public consultation

See public involvement.

public involvement

A range of techniques that can be used to inform, consult or interact with stakeholders affected by a proposal.

resource

Anything that is used directly by people. A renewable resource can renew itself or be renewed at a constant level. A non-renewable resource is one whose consumption necessarily involves its depletion.

risk analysis

Technique used to determine the likelihood or chance of hazardous events occurring (such as release of a certain quantity of a toxic gas) and the likely consequences. Originally developed for use in nuclear and chemical industry where certain possible events, of low probability, could have extremely serious results. Attempts are being made to use concepts from probabilistic risk analysis to characterise environmental impacts, whose occurrence and nature are not easy to predict with any degree of accuracy.

secondary impact

Indirect or induced changes in the environment, population, economic growth and land use and other environmental effects resulting from these changes in land use, population and economic growth. The potential effects of additional changes that are likely to occur later in time or at a different place as a result of the implementation of a particular action.

scoping

An early and open activity to identify the impacts that are most likely to be significant and require investigation during the EIA work. Can, also, be used to:

- identify alternative project designs/sites to be assessed;
- obtain local knowledge of site and surroundings; and
- prepare a plan for public involvement.

The results of scoping are frequently used to prepare a Terms of Reference for the EIA.

screening

Preliminary activity undertaken to classify proposals according to the level of assessment that should occur.

social impact assessment

The component of EIA concerned with changes in the structure and functioning of social orderings. In particular the changes that a development would create in: social relationships; community (population, structure, stability etc); people's quality and way of life; language; ritual; political/economic processes; attitudes/values. Can sometimes include health impacts.

stakeholders

Those who may be potentially affected by a proposal eg: local people, the proponent, government agencies, NGOs, donors and others.

State of the Environment reports

Reports that provide an assessment of the conditions of the environment, pressures on the environment and the responses of the environment to those pressures.

strategic environmental assessment

An EIA-like appraisal procedure that examines the likely environmental impacts of proposed policies, programmes and plans.

synergistic

By acting together, separate elements produce a greater effect than would be produced if they acted separately.

tiering

Addressing issues and impacts at the appropriate level of decision-making (eg from the policy to project levels).

Terms of Reference (ToR)

Written requirements governing EIA implementation, consultations to be held, data to be produced and form/contents of the EIA report. Often produced as an output from scoping.

transboundary impacts

Any impact, not exclusively of a global nature, within an area under the jurisdiction of a Party caused by a proposed activity the physical origin of which is situated wholly or in part within the area under the jurisdiction of another Party.

value judgement

The use of opinion or belief in analysis or decision-making.

10. LIST OF REFERENCES

Canadian Environmental Assessment Agency (1995) *Guide on Biological Diversity and Environmental Assessment*. (Draft). Hull: Canadian Environmental Assessment Agency.

Carew-Reid, J. et al., (1994) *Strategies for National Sustainable Development : A Handbook for their Planning and Implementation.* London : Earthscan in association with IUCN and IIED.

Commission of the European Communities (1985) Directive on the Assessment of the Effects of Certain Private and Public Projects (85/337/EEC). *Official Journal of the European Communities* 175.

Commission of the European Communities (1993) Council Regulation 1836/93 on an Eco-Management and Audit Scheme. *Official Journal of the European Communities* L168.

Commission of the European Communities (1993) *Report from the Commission on the Implementation of Directive 85/337/EEC*. COM (93) LP final. Brussels : Commission of the European Communities.

Daly, H and R. Goodland (1993) *Environmental Assessment to Approach Environmental Sustainability.* Paper prepared for UNEP Expert Consultative Group Meeting on EIA. Paris 27-28 October 1993.

Eckman, K (1993) *Monitoring Natural Resources Projects in Developing Countries Using Early Warning Indicators of Uusustainability.* PhD Dissertation. St Paul, Minnesota : University of Minnesota College of Natural Resources.

Environmental Resources Management (1992) *Management of the Environment and Natural Resources in Hainan Province. Draft Environment and Natural Resources Master Plan and Action Plan for Environmental Improvement and Management of Hainan.* Prepared for Asian Development Bank.

IIED, WRI and IUCN (1995) *A Directory of Impact Assessment Guidelines.* London : IIED.

Institute of Ecology, Padjadjaran University (1979) *Environmental Impact Analysis of the Saguling Dam* Volume II A : Main Report. Bandung, Indonesia: Institute of Ecology, Padjadjaran University.

Interorganizational Committee on Guidelines and Principles for Social Impact Assessment (1995). Guidelines and Principles for Social Impact Assessment *Environmental Impact Assessment Review.* 15(1), 11-43.

IUCN Nepal (1995) *EIA of the Bara Forest Management Plan.* Kathmandu: IUCN Nepal.

Morris, P and R. ThÈrivel (eds.) (1995) *Methods of Environmental Impact Assessment.* London : UCL Press Ltd.

Munasinghe, M. and Cruz, W (1994) *Economy wide Policies and the Environment: Emerging Lessons from Experience* Washington DC : The World Bank.

NATO Committee on the Challenges of Modern Society (1994 et. seq.) *Various Reports.* Brussels : NATO.

OECD (1992) *Good Practices for Environmental Impact Assessment of Development Projects.* Paris : OECD.

Pretty, J. N. (1993) *Environmental Assessment and Participation : Some Challenges and Dangers.* Unpublished paper, London : IIED.

Sadler, B (1986) *Impact Assessment in Transition.* Unpublished paper.

Sadler, B (1995) *Global Change and Environmental Assessment : Background Notes* Paper prepared for International Workshop, 27-29 March 1995, Kingston, Ontario, Canada.

Sadler, B (1995) *Environmental Assessment : Toward Improved Effectiveness.* Interim Report and Discussion Paper, Hull : Canadian Environmental Assessment Agency.

Sadler, B and R. Verheem (1994) *Strategic Environment Assessment : Draft Discussion Document.* Presented to the SEA Workshop, 15-16 December, 1994. The Hague, Netherlands.

Swaziland Environment Authority (1994) *Draft Regulation and Guidelines on Environmental Audit, Assessment and Review.* Mbabane, Swaziland : Swaziland Environment Authority.

UNDP (1992) *UNDP Manuel et Directives du PNUD Pour la Gestion de L'Environnement et le Developpment Durable* New York : UNDP (English text also available).

UN Economic Commission for Europe (1991) *Convention on Environmental Impact Assessment in a Transboundary Context.* (Espoo, Finland) Geneva : UN Economic Commission for Europe.

UNEP (1988) *Environmental Impact Assessment : Basic Procedures for Developing Countries.* Bangkok : UNEP Regional Office for Asia and the Pacific.

UNEP Industry and Environment Office (1995) Environmental Management Tools. *Industry and Environment.* 18 (2-3).

Vanclay, F and D Bronstein (eds) (1995) *Environmental and Social Impact Assessment.* John Wiley.

Wood, C (1995) *Environmental Impact Assessment: A Comparative Review.* London : Longman Higher Education.

World Bank (1991) *Environmental Assessment Sourcebook.* Volumes 1-3 Washington, D.C. : World Bank.

World Bank (1994 et. seq.) *Environmental Assessment Sourcebook Updates* Washington. D.C. : World Bank.

World Bank (1995) *Environmental Assessment : Challenges and Good Practice.* Environment Department Paper No 018 Washington DC : The World Bank.

World Commission on Environment and Development (1987) *Our Common Future.* Oxford : Oxford University Press.

ANNEX I

Social impacts

In certain countries, (for example, the USA, Canada and, to a lesser extent, Australia) in the 1970s and early 1980s, there were many proposed projects, usually involving exploitation of mineral or hydrocarbon reserves, which were located in rural areas with long-established communities having distinctive cultures or social characteristics different, to varying extents, from the larger society. These communities were either descendants of immigrant groups (ranchers in the USA) or indigenous ethnic groups (Aboriginals in Australia). Despite their differences, such groups shared a common anxiety in relation to the proposed developments. They were concerned about the effects on their culture and way of life. From their point of view they were part of the environment and it seemed unfair to consider impacts only on flora and fauna, not on the local people. This situation was one of the main reasons for the development and use of social impact assessment as part of an EIA or as a separate study.

Social impacts can be subdivided into:

- *Demographic impacts* such as changes in population numbers, population characteristics (such as sex ratio, age structure, in-and out-migration rates and resultant demand for social services (hospital beds, school places, housing etc);
- *Cultural resource impacts* including changes in archaeological, historical and cultural artefacts and structures and environmental features with religious or ritual significance; and
- *Socio-cultural impacts* including changes in social structures, social organizations, social relationships and accompanying cultural and value systems (language, dress, religious beliefs and ritual systems).

In many EIAs social impacts are considered to be only changes in population characteristics. It is likely that these impacts alone are assessed because such impacts are readily quantifiable and are easily calculated using well understood techniques. They can be given numerical values (for example, number of in-migrants and expected family size) which can provide an indication of the magnitude and scale of likely changes. This restricted view of social impacts, however, omits more than it includes. An entire category of impacts, which for convenience, can be called 'socio-cultural' as opposed to demographic, is ignored. In the main, this is due to the lack of an accepted technique for predicting such impacts and the non-existence of detailed knowledge of the social effects of a variety of projects in different settings.

Socio-cultural impacts are those changes in social relations between members of an institution, community and society resulting from external influence. Social impacts include changes in such features of social life as:

- quality of life/way of life;
- social organisation and structures;
- cultural life; including such aspects as language, rituals and general life-style (such as dress). It is the components of cultural life which make a social group immediately recognisable as distinct from other groups;
- political and dispute-resolution institutions and processes;
- relationships between generations; and
- values.

From a consideration of both demographic and socio-cultural impacts, a working definition of 'social impacts' can be offered. Social impacts include changes which affect individuals, institutions, communities and larger social systems and the interactions between them. In basic terms, these are alterations in the way people live, work, play, relate to each other, and organise to meet their needs and changes in the values, beliefs and norms that characterise their 'group' and guide their individual and collective actions (Interorganisational Committee on Guidelines and Principles for Social Impact Assessment, 1995).

There are two very important conceptual and technical reasons for incorporating social impacts within EIAs. First, people and their social groups (such as villages and tribes) are a component part of their environment. The strength and diversity of the linkages are, perhaps, stronger in developing countries compared with industrialised countries. Since they are part of the environment there are good logical grounds for assessing social impacts (indeed there are, also, good political reasons). There is often a direct link between social and subsequent biophysical impacts. For example, a project in a rural area can result in the in-migration of a large labour force, often with families, into an area with a low population density. This increase in population can result in adverse biophysical impacts unless the required supporting social and physical infrastructure is provided at the correct time and place. Additionally, direct environmental impacts can cause social changes which, in turn, can result in significant environmental impacts. For example, clearing of vegetation from a riverbank in Kenya, to assist construction and operation of a dam, eliminated local tsetse fly habitats. This meant that local people and their livestock could move into the area and settle in new villages. The people exploited the newly available natural resources in an unsustainable way by significantly reducing wildlife populations and the numbers of trees and other woody species which were used as fuel wood. A purely 'environmental' EIA might have missed this consequence because the social impact of actions associated with dam construction would not have been investigated.

The close relationships between social and environmental systems make it imperative that social impacts are identified, predicted and evaluated in conjunction with biophysical impacts. It is best if social scientists with experience of assessing social impacts are employed as team members under the overall direction of a team or study leader who has an understanding of the links between social and biophysical impacts and who is able to ensure, therefore, that integration occurs throughout assessment work. Sometimes the social impact assessment is done almost in isolation from the other work and the results of the work are incorporated in the EIA report as a 'stand alone' chapter which has very little connection to the rest of the text. This is little better than having a completely separate social impact assessment report. Both outcomes should be avoided.

Secondly, local people are often **not** the main beneficiaries of development projects. Often they may enjoy a few short-term benefits (increased access to jobs, especially during the construction phase), but are subject to a variety of cumulative adverse impacts which are long-lasting if not permanent (such as local natural resource depletion and declining air/water quality). It should never be assumed that this generalisation is universally true – however, experience has shown it to occur frequently. Increasingly, equity and gender issues are appearing as prominent development-oriented objectives in the policies of various governments and multi- and bi-lateral agencies. Information on the social distribution of the environmental costs and benefits is important to design mitigating measures and to inform decision-makers of the equity effects of particular development options.

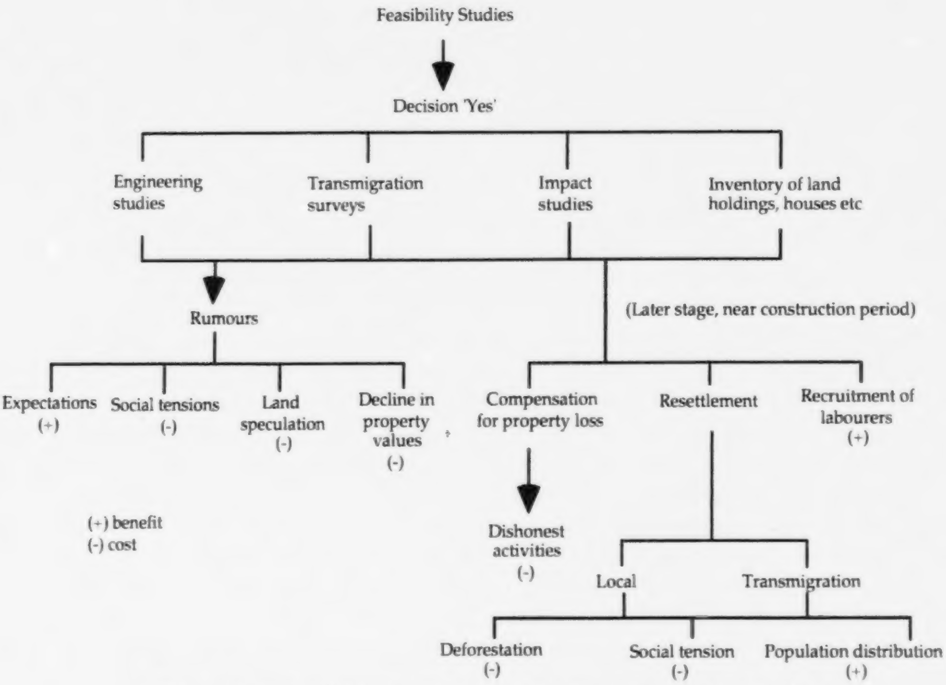
Feasibility Studies
Decision 'Yes'
Engineering studies
Transmigration surveys
Impact studies
Inventory of land holdings, houses etc
Rumours
(Later stage, near construction period)
Expectations (+)
Social tensions (-)
Land speculation (-)
Decline in property values (-)
Compensation for property loss
Resettlement
Recruitment of labourers (+)
(+) benefit
(-) cost
Dishonest activities (-)
Local
Transmigration
Deforestation (-)
Social tension (-)
Population distribution (+)

Figure 4. Potential impacts during the pre-construction period

There is a current trend which will encourage integration of social impact assessment into EIA. EIAs, increasingly, incorporate a programme of public consultation and review. This provides an opportunity for individuals and groups to influence the nature and location of proposed developments via EIA. There is an important side-effect to this process which is often overlooked. People and social groups react to expected changes which affect their interests and can take proactive steps to prevent, avoid or reduce the intensity of expected events. Species and natural communities cannot act similarly. This specific 'social' issue will lead to greater consideration of social impacts, on the part of developers, governments and agencies, as a way of encouraging the creation of a planning process which encourages local people to adapt in reasoned and acceptable (to them) ways to expected changed circumstances. Successful pursuit of this strategy should lead to more successful project implementation through elimination of delays and other costly events resulting from low levels of consensus amongst all the interested and affected parties in the development process.

The process of social impact assessment is identical, in terms of the major activities and their sequence, to EIA, thus including it within EIA is relatively easy. There are, however, a number of issues specific to social impact assessment which need to be taken into account. First, and this is a direct consequence of the human propensity to act in advance of expected events, social impacts can occur from the moment people learn that a proposed project might be implemented in their locality. At this stage direct biophysical impacts do not occur, unless individuals and groups take some action which has such consequences. In the EIA for the Saguling dam in Indonesia, a number of impacts were identified and assessed relating to the pre-construction period (Institute of Ecology, Padjadjaran University, 1979). A flow diagram was constructed to show the main harmful and beneficial impacts and their relation to each other (see Figure 4).

The issue of proactive response is also important when impacts have been predicted and public consultation occurs based on an interim or draft EIA report. Interested and affected individuals and groups may react to the information in ways that may result in impacts. The nature of any response should be identified and, if possible, assessed before consultation occurs. This is not easy to do and is often omitted from EIAs.

Social impacts, like other impacts, need to be evaluated for their importance and significance once their extent and magnitude have been predicted. When assigning significance it is less easy to rely on scientific, 'objective' judgements provided by those implementing the assessment or on pre-existing criteria or standards. The 'social' significance assigned to changes by individuals and particular social groups differs and needs to be incorporated into decisions on significance. Certain biophysical impacts will be a focus of public concern and 'social' significance an important consideration, but the degree to which social significance is to be included in decisions on significance is probably greater in relation to social as opposed to biophysical impacts.

Finally, when an impact management plan is prepared covering mitigation, monitoring and community liaison requirements, it is important to consider that mitigation can apply not only to the proposal (design, siting, construction schedule etc) but also to the host community or region likely to be affected. Communities can implement actions to reduce, if not avoid, significant adverse effects independent of actions aimed at the project. Also, it can be useful to consider whether any measures to mitigate biophysical impacts may have important social impacts.

Social impacts can be very difficult to identify and predict with any degree of certainty because of the variety and complexity of social structures and systems. Demographic and cultural resource impacts may be the exception to this 'rule'. This contrasts, to some extent, with our ability to predict biophysical impacts such as noise, concentrations of air pollution, some ecological impacts and the effects of water pollution.

The extent of a social impact assessment will depend on the output of scoping activities. It is suggested, however, that there is a 'minimum' approach which can be taken to deal with certain social impacts. This approach focuses on the relationships between local people and natural resources (World Bank 1991).

The first stage is to identify the specific social groups which make up local communities. Important social categories or characteristics which can be significant include:

- ethnic/tribal affiliation;
- occupation;
- socio-economic status;
- age; and
- gender.

The next main step is to determine the degree of local control over natural resources, whether or not recognized formally in law. Control is defined as the actual ability to make major decisions regarding access to local resources and production and distribution rights in terms of the outputs from local resources. The links between the identified social groups and control over natural resources should be determined through identification and analysis of the institutions by which decision-making regarding use of natural resources and the resolution of conflict occurs. Next, it is necessary to identify the production systems by which different groups obtain their livelihood from natural resources.

Finally, the various production systems need to be analyzed to determine their nature and variation in time and space. For example, fishing communities typically divide production activities between the water, beach and inland areas with the latter two localities often providing more than 50% of dietary intake. A social impact assessment which considered only marine-related production systems, for a fishing community, would be unable to predict all likely social impacts because of the omission of the other sources of food. Throughout the social impact assessment process the above steps should be undertaken by an anthropologist or rural sociologist with expertise/experience, if possible, in both social impact assessment and the communities/cultures of the area likely to be affected by a project. Part of the process, and a very important one, would be consultation with local communities and with representatives of the social groups identified early in the process. In this way, the analysis by the external expert takes into account the views/perceptions and insights of the people themselves.

Health

Traditionally, health issues have been given little attention in EIAs. Even when social impacts were being investigated, the effects of a proposal on individual mental and physiological well-being (health status and trends) were often omitted or treated in an unsatisfactory manner. The World Health Organization (WHO) defines health as '*....the extent to which an individual or group is able to realise aspirations and satisfy needs and .. to change or cope with the environment.. it is a positive concept emphasising social and personal resources, as well as physical capacity*'. It is not just the absence of disease. If this view is accepted, then the links between health and social impacts are very apparent. Often, but not always, health impacts depend on initial environmental impacts such as habitat changes causing increased vector densities (such as the black fly which transmits onchocerciasis, commonly known as river blindness, or the snail involved in transmission of bilharzia) or increased likelihood of contact between the vectors and humans. This direct relationship between a biophysical change and disease incidence may be one of the reasons why social impact assessments do not always examine health impacts. However, there are disease pathways which occur solely within a social context. A common example is an increased incidence of sexually transmitted diseases resulting from the influx of a large construction labour force (predominantly male), with money to spend, into a rural area.

There are winners and losers in the development process. Some groups or individuals may be more exposed to harmful pollutants and their health status may decline. Also, some groups may suffer a reduction in their standard of living and become poor if their resource base is degraded or reduced with no comparable substitute(s) provided. Such a change in socio-economic status can be accompanied by increases in morbidity and mortality due to poor nutrition, insanitary living conditions and reduced physical and financial access to health care facilities.

Similarly, relocation of individuals and groups to new areas to enable a development to occur (a dam flooding a valley containing several villages) has been shown to increase death and illness rates amongst those being relocated. The old and the young have been the most vulnerable to illness and death. Health impacts can occur, also, directly from a development, particularly from an hazardous installation when an accident occurs such as the release of a certain amount of a toxic gas (as occurred at Bhopal) or an explosion.

As in the case of social impact assessment, the EIA logical framework of step-by-step activities, undertaken to assess and evaluate impacts and to formulate mitigation and monitoring measures, applies to health impact assessment. The scoping activities will determine the specific health impacts to be investigated and an expert in environmental or public health should be part of the overall EIA team. Depending on the type of project and its locality it may be necessary to use specialists to provide periodic advice/input to the health expert (for example, toxicologists, epidemiologists and social psychologists).

The assessment of health impacts is based on an identification of health hazards. This involves identifying the kind of hazards normally associated with projects of a specific type in a region. The next step is to assess the change in health risk attributable to the project. This involves identifying environmental factors which may cause health impacts and the individuals or groups who are potentially threatened by changes in these factors. These changes can arise from both routine and normal operating discharges, habitat alterations or unexpected conditions or events (an accident). The factors or agents, whose nature and behaviour can be affected by a proposed development can be classed as chemicals, radionuclides, organisms or physical phenomena (pressure waves from explosions). Finally, it is essential to assess the capability of existing health institutions to protect the individuals or groups from the hazardous agents.

Once this is done a useful approach is to describe the known relationship between the 'dose' of a health-impact-causing agent and the predicted health impact in the exposed group(s). Next, an assessment is made of the exposure of the group(s) to the pathways by which agents can affect them. Specific 'doses' should be estimated for various alternative options and for each threatened group. These 'dose' estimates are then compared with the known or expected 'dose'-response relationships. This comparison enables an estimate to be made of the likely magnitude of the health impacts. Unfortunately, 'dose'-response relationships do not work for communicable diseases, malnutrition or injury. For exposures that occur sporadically (accidents) instead of continually, it is necessary to estimate, using probabilistic risk analysis, the likelihood of the event occurring and combining the results with the exposure assessment.

ECONOMIC AND FISCAL IMPACTS

Economic Impacts

The reasons which have resulted in the incorporation of social impacts into EIA have acted, also, to encourage integration of economic impacts. There can be no doubt that changes in the local economy can have a direct bearing on 'quality of life' for individuals and communities. The focus of economic impact assessment is the estimation of changes in employment, per capita incomes and levels of business activity.

The magnitude and extent of economic impacts are dependent on the following main factors:

- duration of construction and operational periods;
- workforce requirements for each period and phasing of construction workforce needs (numbers to be employed during the peak phase for construction works);
- skill requirements (local availability);
- earnings;
- raw material and other input purchases;
- capital investment;
- outputs; and
- of course, the characteristics of the local economy.

Without reliable information on these factors it is very difficult to implement an economic impact assessment. It is vital to attempt to obtain such data – if this does not occur, then not only economic impacts but also and health impacts will not be predicted adequately.

When a new major project is proposed it is essential to obtain information on the proposed employment levels and expenditures on labour and local materials and services. At the

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same time it is necessary to undertake a baseline study of the local labour market and economy. Using data from these studies, projections can be made of the likely economic impacts.

It is essential to obtain information on the size of the labour forces required for construction and operation, the skills required (numbers of managers, engineers, office staff and labourers), age breakdown, average incomes and the length of time for which they will be employed. Experience from past economic impact assessments has shown a tendency for developers to overestimate the numbers of workers required for construction. It is difficult to achieve accuracy in this matter because of inherent uncertainty and technological changes which render past experience redundant. Nevertheless, some attempt should be made by those involved in the assessment to determine the size of the labour force and the time for which it is required (for example, construction labour forces tend to reach a peak about mid-way through the construction period then slowly decline). As well as estimating labour forces, it is very useful to obtain information on capital expenditure by the developer on locally produced goods and services which will be required for both construction and operational phases. At the same time as these data are being obtained, a survey of the local economy should also have been undertaken.

Information should relate, primarily, to the local labour market. Generally, a local labour market is defined in terms of the travel-to-work pattern of local people. Precise definition of a local labour market is difficult and will vary from case to case. Initially, the nature of the local industrial structure should be examined. This examination should include the degree to which local employment depends on a particular industry – for example, food processing. Data on the industrial structure should be collected over time to determine trends in the growth and decline of particular industries.

Additionally, the occupational structure of the local labour market should be analyzed. This should cover the number of workers with particular skills, vacancies that exist for specific skills – for example, welding – and the average wage levels for the different skill groups. Also, it is important to collect information on the unemployed in terms of their numbers, age and skills. This information is important because it can be an important determinant of the extent to which the unemployed can take up jobs made available by a project. If the unemployed were found to be elderly, then it is unlikely that many would wish to take up jobs involving labouring for long hours. Finally, an examination of male/female activity rates (the proportion of a population of working age which is in 'full' employment) can give a useful indicator of hidden employment reserves. Once data on likely employment characteristics relating to the project and on the local labour market have been obtained, an attempt can be made to predict economic impacts.

There are a number of techniques available to predict economic impacts, but the most common is the income and employment multiplier. It works on the basis of an initial income injection into a local economy. This income injection is provided by the wages of direct employees at a proposed installation and any expenditure on local goods and services required for construction and operation of the project.

This initial income injection represents extra money which is incorporated, to a certain extent, in the local economy. This extra money is spent, by those who receive it directly, on other goods and services (some of which might be locally produced). This means that those who have produced the goods and services also enjoy a rise in income which subsequently is spent in a similar way as in the first round of expenditure. This process is repeated with a smaller amount being passed on at each stage. The eventual increase in local incomes depends on how many individuals purchase local goods and services.

In many economies, increased direct income is either saved or exported from the economy in remittances to family and other kin outside the local area. If this were a characteristic of a particular workforce then the value of the multiplier would be low. On the other hand, if consumption of local goods and services were high then the value of the multiplier would also be high. The higher the income multiplier the more jobs created in the local economy.

It is important to realise that there are a number of factors which will determine the economic (in particular, employment) impacts of a project. It has already been stated that the characteristics of the unemployed will affect their ability to benefit from new employment opportunities.

Also, activity rates showing a reservoir of suitable labour might also be misleading. Various social/cultural and economic factors may mitigate against men/women wishing to work in an industrial environment. For example, men who have a number of different occupations may not, as a result of previous experiences, wish to take the risk of single occupation employment. They might rather spread the risk of failure or job loss over a number of part-time occupations.

The effects of a new major project on existing long-established industries may be deleterious. The possibility exists of labour being attracted away from existing industries. The extent to which this will happen depends on:

- the wages being offered in comparison with those obtainable locally;
- the presence of appropriate skills in other firms; and
- intangible factors connected with work satisfaction.

It is possible that existing traditional industries might lose labour if they cannot compete with incomes offered at a new installation. This might have two consequences. First, the industry might close and the remaining employees lose their jobs. Alternatively, owners might be able to increase capital expenditure and buy machines to replace the lost labour. Should such industries lose labour to a construction workforce then increased mechanisation might mean that those employees who lose their jobs when a project has been built are unable to obtain their previous jobs. The impacts of a new project on existing industries should be assessed, though this is a very difficult task. The loss of certain industries through competition for labour might be economically marginal, but if the industries (and skills) concerned have a cultural significance in terms of ethnic or national identity then their loss might be considered to be very serious.

The economic impacts of a project are the main cause of social impacts. This is especially true if the construction and/or operation of a project results in the in-migration of workers from outside the local area. This does not always happen – it depends on whether the local labour market is able to supply the type of workers required by the new installation.

Employment opportunities created by a new project can be divided into four categories:

- construction employment. This includes both employment related to the construction phase of the project and the provision of basic infrastructure;
- direct employment at the project;
- increases in employment, if any, brought about by linkages between the proposed development and local firms; and
- possible increases in service sector employment.

In-migrants might take up job vacancies in any of these four categories.

The size and type of in-migration can cause a number of social impacts. For example, construction labour forces tend to be young, single men with few local connections.

Generally, they are transient, moving from one site to another. The main demand of such individuals is likely to be for adequate accommodation, sewage treatment, hospitals and recreation provision.

In contrast to construction work forces, the operational work force is likely to be permanent (until the installation closes). Workers will bring their dependants with them and as a result the impacts on local service provision such as schools, hospitals, sewage treatment and leisure facilities will be more comprehensive and longer lasting than those resulting from construction workers.

In many developing countries the phenomenon of induced development needs to be considered. New large projects represent 'islands of prosperity in seas of poverty'. As such they attract people hoping to take advantage of job opportunities and the health and educational facilities which often accompany new projects. If this movement and aggregation of people occurs then local areas can receive more in-migrants than might be expected from an analysis of the number of jobs likely to be available. These people can place significant additional strains on local infrastructure, the environment and local government resources.

Fiscal Impacts

When economic impacts are being investigated the focus is, usually, on the effects on the nature and behaviour of the local economy. Commonly, the economic consequences for local and other government organizations are omitted. These consequences are termed fiscal impacts because they are concerned with changes in the costs and revenues of these organizations. Major projects can cause large increases in population and, as a result, cause stress to local services (such as health provision) and infrastructure (for example, roads and sewerage). Key factors determining fiscal impacts include:

- size of investment and workforce requirements;
- capacity of existing service delivery and infrastructure systems;
- local/regional tax or other revenue-raising processes; and
- likely demographic changes arising from project requirements (these need to be estimated during the assessment of social impacts).

Using such information, the fiscal impacts can be predicted and action taken to avoid or minimise possible consequences which might strain local government finances. One common problem often arises from the need for expenditure on services and infrastructure which increases more rapidly than revenue from the project, creating a 'deficit' and short-term cash flow difficulties. Unless borrowing is permitted, this can cause serious problems with needed infrastructure and services not being provided, or being provided only in part although they were intended to be in place when a project was approved. Lack of provision can cause social and environmental impacts through overloading of infrastructure such as water supply networks or sewerage systems. Again, there is a direct linkage between biophysical damage and social changes.

A problem which can increase such difficulties is the possible miss-match between project fiscal impacts and local administrative boundaries. It can be that the project revenues are received by one local government entity, but most of the costs, in terms of services/infrastructure provision, have to be met by another entity as most people decide to live within the boundaries of that government entity. If this situation is considered in the context of an EIA, then valuable time can be saved by formulating a strategy for dealing with the problem instead of developing a remedial strategy once the problem has begun to occur.

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Risk and Uncertainty

EIA deals with future events and, thus, has to cope with the issue of predicting events whose likelihood of occurrence is not known precisely or accurately. Until recently this issue was handled, usually, by ignoring it. EIA reports used phrases such as 'will' and 'might' to indicate in a qualitative manner the likelihood or probability of events occurring. It was left to the decision-makers and the public to interpret the meaning and significance of such qualitative expressions. As can be imagined, this is not an easy task.

It is useful to distinguish between risks and uncertainties. Risks are involved when probabilities can be assigned to the likelihood of an event occurring – for example there is a likelihood of 1 in 10,000,000 (10^{-7}) per year that someone will be struck by lightning in a particular country. Uncertainty is concerned with a situation in which very little is known about future events (or impacts) and therefore no probabilities can be calculated and assigned to outcomes. There are, also, events which are unknown and cannot be anticipated in advance. For example, the use of chlorofluorocarbons (CFCs) has led to ozone depletion. This was an unknown outcome when CFCs were introduced into refrigeration and, realistically, could not have been evaluated as an impact when they were introduced.

Hazardous Events

It is useful to define the term 'hazard' at this point because it is used, commonly, in EIA and project appraisal. A hazard can be defined as the inherent or intrinsic property of a system (which can be an operating factory or a mode of transport) to cause damage. The likelihood of that damage or harm occurring is termed the risk. Risk assessment is the scientific process of assessing the probability of an adverse effect of defined characteristics caused by a hazardous event occurring (for example, the explosion or release of a toxic gas occurring at a chemical installation). It answers two basic questions:

- How likely is an event to occur?
- How harmful can it be in terms of deaths, injuries and property and ecosystem damage?

Risk assessments have been undertaken, traditionally, for proposed hazardous facilities such as nuclear power stations, pipelines transporting flammable materials and installations which use or produce hazardous materials. In the past these have been undertaken separately from EIAs - often because there were no EIA requirements, but even when EIA requirements existed. Basically, risk assessment is based on engineering systems and their potential malfunction and then relating the consequences of such an event to human health (mortality and morbidity) and structural damage to buildings.

There are three distinct stages in a probabilistic risk assessment:

- identification of hazards;
- identification of initiating events that might lead, via various pathways or scenarios, to a hazardous event occurring; and
- quantification of the probabilities accompanying the various initiating events and the associated consequences of the final hazardous event.

Probabilistic risk assessment is a very specialised technique for predicting hazardous events and their social, health and environmental impacts. As such it is now seen as less of a 'stand alone' specialised activity and is now more frequently an integrated part of EIAs although its integration is by no means universal.

Impact Probabilities

There has been an increasing dissatisfaction, particularly in the industrialised countries of the north, concerning the vague, qualitative way in which many social, health and environmental impact predictions are expressed. Decision-makers and the public have been

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seeking more and more information on the likelihood of certain impacts occurring (for example, instead of a statement such as, *'....is likely to reduce fish biomass by 10 per cent* it is possible to be more specific, *'....there is a risk of 0.2 of a 30 per cent reduction in fish biomass even though the expected reduction is only 10 per cent)* The latter statement gives more information to decision-makers. It is now realised that EIA reports could be improved if concepts and techniques taken from probabilistic risk assessment could be used to produce probabilities for impacts, particularly those affecting ecological systems (and species) and social systems (local communities). There is one additional benefit. Quite often in EIAs, worst case analyses are used to ensure, basically, that potentially serious impacts are not under-estimated. There is a general preference, in EIA, to be conservative and over-estimate impacts rather than under-estimate impacts and have to initiate 'emergency' mitigation measures. Decision-makers can find it difficult to deal with such worst case analyses if no probability estimates are given. In fact, there is a potential to remove worst case analyses from EIAs as probabilistic analysis of a range of impact outcomes could include, automatically, the worst case event.

There is, however, little real life experience in identifying probabilities for EIA predictions, and the costs and resource implications of trying to do so are not clear. At present, it would seem appropriate for EIA teams to be aware of the benefits of assigning probabilities and to do so when and where appropriate without compromising the overall quality of the EIA work and exceeding budgetary and time constraints. In the case of hazardous installations, the use of probabilistic risk assessment is essential within the overall EIA study.

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